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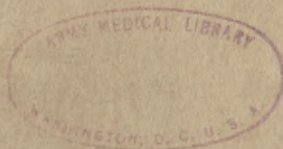


CONVALESCENT MEDICINE

Manual of Physical Therapy

Manual of Occupational Therapy

Emergency Treatment of Acute War Neuroses

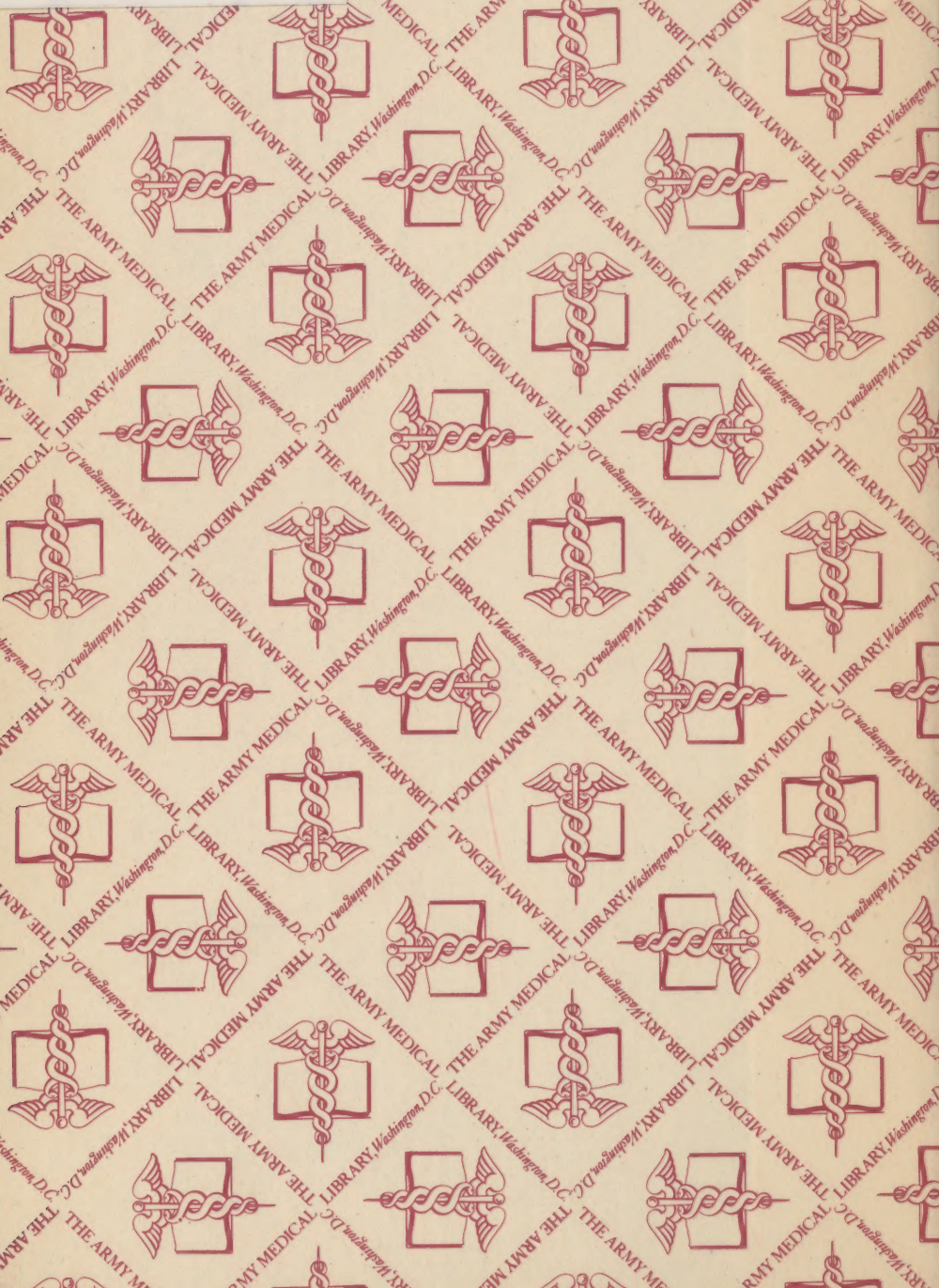


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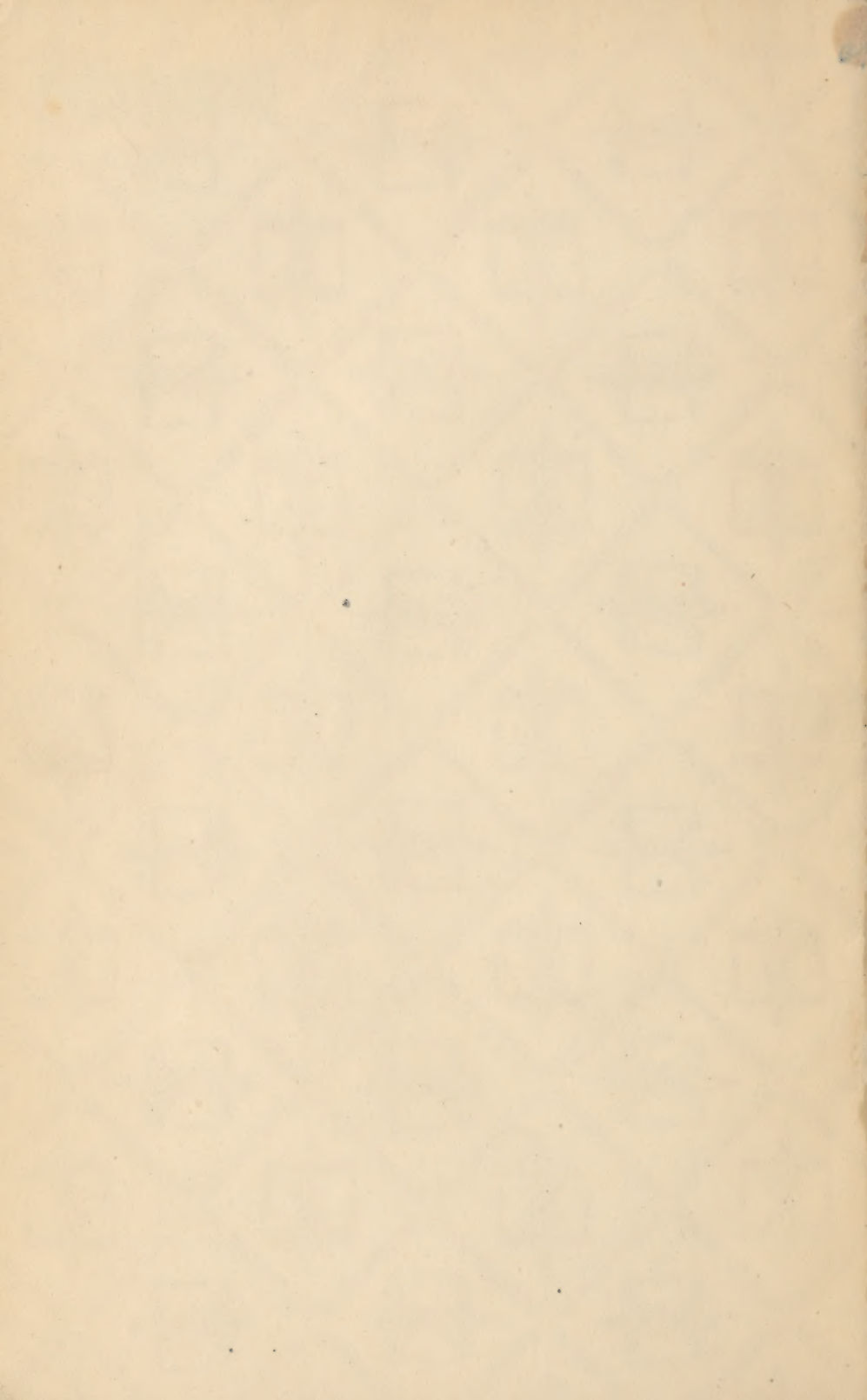


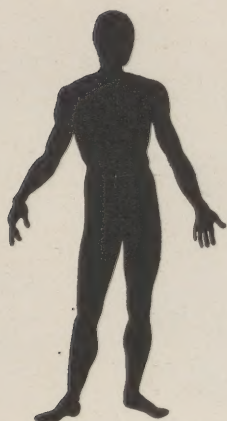
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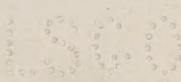
Manual of Physical Therapy

Manual of Occupational Therapy

Emergency Treatment of Acute War Neuroses

A Collection of Articles Reprinted, With Permission, From War Medicine

By The United States Office of War Information 1945



MANUAL OF PHYSICAL THERAPY.

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MANUAL OF PHYSICAL THERAPY

INTRODUCTION

The Division of Medical Sciences of the National Research Council was asked to furnish the medical departments of the United States Army and Navy with compact presentations of necessary information to be used by medical officers of the Army and Navy in the emergency. In response to that request, this manual was prepared by the Division's Subcommittee on Physical Therapy and the Council on Physical Therapy of the American Medical Association. The personnel of these groups is as follows:

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MANUAL OF PHYSICAL THERAPY

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CHRONIC ARTHRITIS AND RHEUMATOID CONDITIONS

APPLICATION OF HEAT

General Considerations.—The use of external heat, both locally and systemically, is of value for combating a large variety of conditions, medical as well as surgical. Within the medical field the clinical states in the treatment of which heat is probably most widely employed are the psychoses, neurological disturbances and various phases of the arthritic and rheumatoid syndromes. For the last-mentioned conditions the application of heat is more extensive and varied than for any other. The full benefits to be derived from the systemic use of heat in this connection are not always forthcoming from the heat alone, however, and sometimes depend on contrasting and accessory applications of cold.

Systemic response to heat is characterized by an increase in circulation proportionate to the rise in body temperature, overventilation of the lungs and loss of water through the expired air, through the skin and, following baths, through the urine also.

A chief end product of metabolism, carbon dioxide, escapes through the lungs, sweat and urine, and one of the fundamental effects of exposure to heat appears to depend on this fact. Under systemic application of heat, the general body metabolism is increased and carbon dioxide is formed in quantities larger than normal. Overventilation of the lungs, however, washes this out in greater proportionate amounts.

Various acid substances, such as phosphates and sulfates, resulting from increased metabolism escape through the urine, and certain fatty acids, including lactic acid, are eliminated through both the urine and the sweat. The net result, therefore, of the loss of these acid substances, chiefly carbon dioxide, is a relative excess of alkali in the blood and probably in the tissues. Systemic alkalosis results, and the excess of alkali is then eliminated through the urine and sweat until the normal acid-base equilibrium is restored. Sustained alkalosis may lead to tetany.

A belief in the value of "elimination" in the treatment of arthritis has long been popular, but there is only limited evidence to support this as an important factor in itself. Elimination of water in the form of sweat may, however, contribute to a betterment of the physiologic disturbances accompanying the rheumatoid state. The possibility that a low grade "edema" of some tissues accompanies certain phases of the arthritic syndrome cannot be dismissed from consideration. There is, however, definite evidence that some of the other effects achieved by exposure to heat play an important role in the treatment of arthritis. These effects are chiefly those arising from the heightened circulation and possibly from an increased metabolism.

Evidence of changes in the circulation is to be seen in the obvious influence on the capillaries of the skin of the cold contrast baths or douches so successfully used in institutional treatment at the conclusion

of the "bake" or the hot bath. A true "metabolic whip" is afforded by cold water properly used.

Systemic Exposure to Heat.—Those patients who are fairly robust afford the best opportunity for this practice. It is important to remember that systemic exposure to heat in any form may occasionally have distressing consequences, either immediately or after a course of treatment, and it is therefore essential to exercise caution in subjecting to such treatment patients who are ill equipped to stand it.

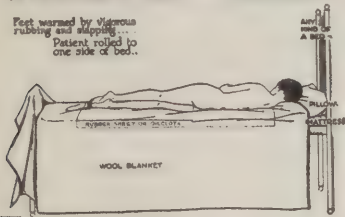
It is difficult to determine beforehand the arthritic conditions which will best respond to exposure to heat, but it probably has its best results in those in which tissue edema is more or less obvious. Atrophic (rheumatoid) arthritis in some stout women responds exceedingly well to this measure. In others of less robust makeup beneficial results may not be forthcoming, and the condition of the patient may be aggravated by the additional burden imposed. Patients with hypertrophic arthritis (osteoarthritis) are in general more robust and can better withstand systemic exposure to heat. It is important to recognize, however, that heat may act as a form of trauma to persons with hypertrophic arthritis and must therefore be carefully administered. It must be pointed out here that exposure to heat or hydrotherapy constitutes only one measure of treatment in the rheumatoid problem and must not be followed except in correlation with other established principles of treatment. A patient with arthritis should not be subjected to the measure under discussion until a complete medical examination has indicated the justifications and indications for it.

The "bake" or the bath may be given alone, in which case profuse sweating is induced and the subject is allowed to rest for an hour or more to compensate for the somewhat debilitating effects; more frequently, the exposure to heat is briefer and sufficient only to inaugurate or induce mild diaphoresis. After this procedure, which is generally administered with the patient in a sitting posture, a "tonic" shower, or douche, is given, beginning with water considerably above body temperature, which is shortly changed to water slightly below body temperature. This change is best accomplished by an attendant who directs on the patient a jet of water, the temperature of which is under control. An exposure of about eight minutes to the electric cabinet "bake," followed by a so-called Scotch douche or other form of cooling hydrotherapy permits the subject to go at once out into the air with a sensation of exhilaration and well-being instead of lassitude. Even persons of robust constitution should be subjected only gradually to these procedures, but by beginning cautiously even patients of a highly asthenic type can be educated to stand them and can be benefited by them.

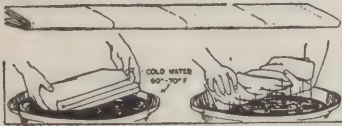
The sweating process alone, without the cooling contrast shower, is more easily attained and can be brought about by means of the hot pack

Step 1 PREPARE BED AND PATIENT

Feet warmed by vigorous rubbing and stepping...
Patient rolled to one side of bed.



Step 2 FOLD WET AND WRING SHEET



FULL WET PACK

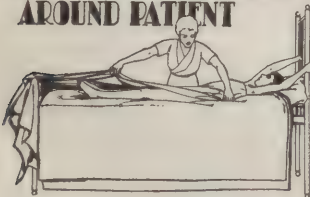
INDICATIONS:

Nephritis, Arthritis, Psychosis, and Psychoneuroses.

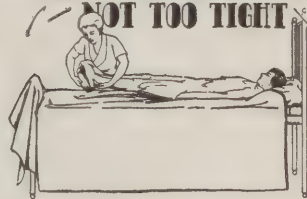
Step 3 UNFOLD AND SPREAD WET SHEET UNDER PATIENT



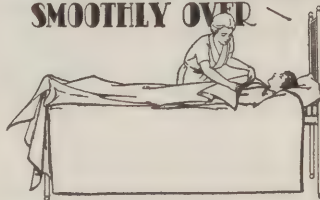
Step 4 TUCK SHEET SNUGLY AROUND PATIENT



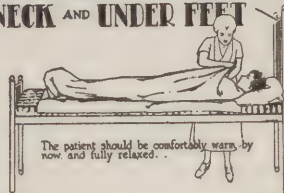
Step 5 WRAP AND FOLD CLOSELY NOT TOO TIGHT



Step 6 WRAP THE BLANKET SMOOTHLY OVER

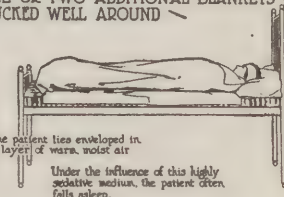


Step 7 FOLD CLOSELY AROUND NECK AND UNDER FEET



The patient should be comfortably warm by now and fully relaxed.

Step 8 EXTRAS ONE OR TWO ADDITIONAL BLANKETS TUCKED WELL AROUND



The patient lies enveloped in a layer of warm, moist air

Under the influence of this highly sedative medium, the patient often falls asleep.

Fig. 1.—Application of a full hot pack (from Krusen, F. H., Physical Medicine, Philadelphia, W. B. Saunders Company, 1941).

or hot bath in almost any household. In many instances the metabolic stimulus given by this single procedure is of great value and should be utilized when circumstances justify it.

The general regimen briefly outlined can be carried out more or less successfully in the home, but the full achievement of such results as follow conduction of these measures by skilled persons in adequately equipped institutions can hardly be expected.

The subject of the influence of induced fever (hyperpyrexia) on various disease states has undergone rapid development, and this procedure is now almost specific for certain conditions, especially gonococcic infections. Chronic atrophic and hypertrophic arthritis are not, however, diseases on which hyperpyrexia can be said to exercise a favorable influence. There is some evidence to indicate that perhaps in a few phases of the arthritic syndrome, especially in the more acute ones, beneficial results may occasionally follow induction of sustained fever with temperatures up to 104 F.

Local Application of Heat.—The local application of heat to involved joints may be comforting and helpful in the treatment of arthritis. Among other influences, local exposure to heat dilates the blood vessels, induces general hyperemia and brings about changes in the vessel walls which permit diapedesis of leukocytes. Local exposure to heat, however, may be followed by unintended systemic effects if carried out improperly or to extremes. In applying heat locally in the case of a rheumatoid syndrome, care must be exercised to avoid adding trauma to the disease process, especially in the case of hypertrophic arthritis (osteoarthritis).

Heat is readily applied in the patient's own home by means of some simple devices.

Homemade Baker: An inexpensive homemade baker can be constructed.

Paraffin Baths: If electricity is unavailable in the patient's home, local applications of ordinary hot paraffin may be employed as a substitute for the simple radiant heat devices.

The following directions are given to the patient for the use of these baths at home: *Hands.* Fill the top of a large double boiler (6 quarts [5.7 liters]) with paraffin (6 to 8 pounds [2.7 to 3.6 Kg.]) and fill the lower part with hot water. Heat until nearly all of the paraffin is melted. To avoid burns, be sure a piece is left unmelted. Remove the double boiler from the fire, and take the top out of the water.

With the fingers separated, dip the hand quickly into the paraffin, being careful not to touch the sides or the bottom of the boiler. Remove the hand. When the paraffin is hardened, dip and quickly remove the hand again. Repeat until a thick glove is formed. Peel off the paraffin glove and put it back into boiler. Make two or three gloves, according to the length of treatment prescribed by the physician.

If exercise is prescribed, squeeze and mold the piece of warm paraffin in the hand before putting it back in the boiler.

Large Joints.—Protect the bed and floor from dripping paraffin with paper. Melt 2 pounds (0.9 Kg.) of paraffin in a small double boiler, according to the technic just described. With a new paint brush (2 to 2½ inches [5 to 6 cm.] wide), dip into the melted paraffin and spread it over the joint. Repeat the spreading of hot paraffin until the joint is completely covered. Work the brush back and forth only enough to spread the hot paraffin smoothly over the previous layer. Continue painting over the hardened layer until a thick coating is made ($\frac{1}{8}$ inch [32 mm.] or more). Remove the coating, put the paraffin back into

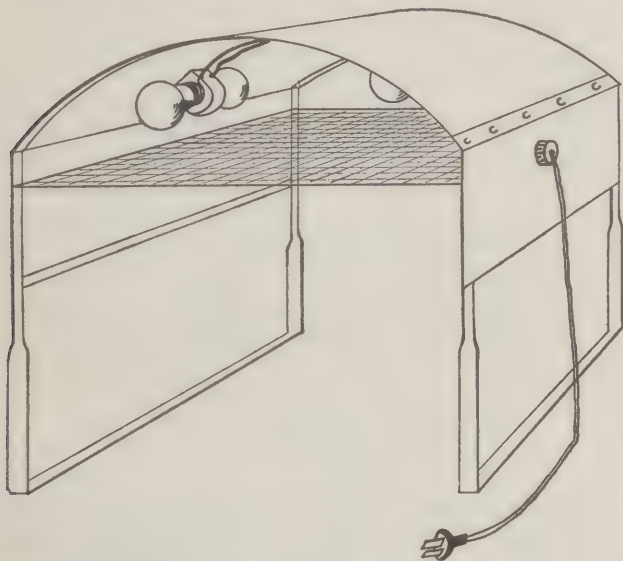


Fig. 2.—An inexpensive home baker for therapeutic use, designed for applying heat to the legs and arms. The specifications for the baker are as follows: length, 17 inches (43 cm.); width, 14 inches (36 cm.); overall height, 14½ inches (37 cm.); altitude of arc, 5 inches (12.5 cm.); frame, $\frac{1}{16}$ by $\frac{3}{8}$ inch (0.16 by 1.5 cm.) strap iron; reflector, highly polished tin sheeting; two double receptacles, General Electric Company, catalog no. 66722, 250 volts, 650 watts; four mazda lamps, 60 watts. The tin is riveted to the strap iron. The receptacles are connected in multiple with a heavy lamp cord 6 feet (183 cm.) long, to the end of which is attached a hubble plug. If the baker is to be used for applying heat to the body, the supports should be 2 or 3 inches (5 to 7.5 cm.) longer.

the boiler and apply additional coats for the length of time prescribed by the doctor.

Hydrotherapy: Whirlpool baths. A simple whirlpool bath for home use can be constructed inexpensively.

Tub baths. It has been found that in certain forms of atrophic arthritis mild febrile reactions may tend to control an exacerbation of the disease.

For a robust patient it is entirely possible, under proper medical supervision, to obtain a febrile reaction at home by placing the patient in his own bathtub. The temperature of the water may be varied between 98 and 105 F. (36.6 and 40.5 C.), and the duration may vary from ten to forty-five minutes. Usually, the patient's oral temperature will rise in thirty minutes to approximately 101 F. (38.3 C.), sweating is induced and the general metabolism is stimulated. In all cases milder temperatures and shorter periods should be used at first, the temperature and duration being increased at subsequent sessions, according to the patient's tolerance.

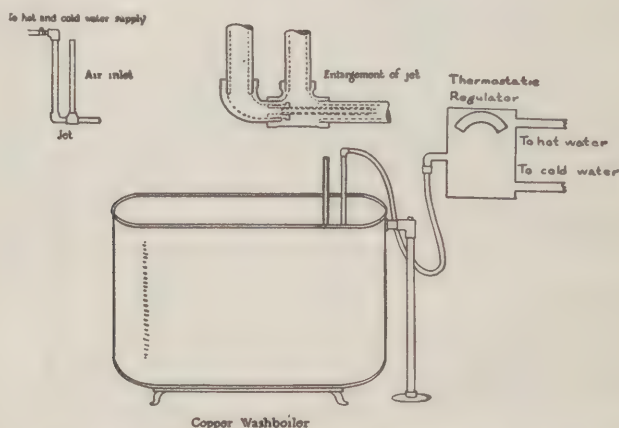


Fig. 3.—A homemade whirlpool bath to be used for relief of edema, for painful cicatrices, for trophic lesions resulting from prolonged suppuration and as a preparation for local massage. The specifications for the bath are as follows: a copper washboiler; a $\frac{1}{2}$ inch (1.27 cm.), 90 degree elbow; a $\frac{1}{2}$ inch, 90 degree street elbow; a $\frac{1}{2}$ inch tee; $\frac{3}{8}$ to $\frac{1}{8}$ inch (1.6 to 0.3 cm.) bushing; $\frac{1}{8}$ inch pipe; outlet, $\frac{3}{4}$ inch (1.9 cm.) nipple with locknuts and a gasket, and $\frac{1}{2}$ inch galvanized iron pipe, enameled white. The street elbow is tapped inside at the male end to fit $\frac{3}{8}$ inch bushing. One-eighth inch pipe is used for the nozzle. A local tinsmith can assemble this unit. Although a factory product would look better and would be more convenient, its therapeutic efficiency would be no greater.

Contrast baths. Contrast baths are especially useful in the presence of cold and clammy extremities. The patient should obtain two buckets or pans of the proper size and shape for immersion of the feet or hands. One container should be filled with hot water at comfortable tolerance, at a temperature from 105 to 110 F. (40.5 to 43.3 C.); the other container should be filled with cool tap water, from 60 to 65 F. (15.5 to 18.3 C.).

The best routine has seemed to be one in which five minutes of heat and two minutes of cold or four minutes of heat and one minute of cold are employed. One should always start and end with immersion in hot water to obtain the best vascular response. An application should last a total of nineteen or twenty-four minutes.

MASSAGE

General Considerations.—In view of the fact that massage is frequently given in conjunction with local exposure to heat and occasionally subsequent to systemic exposure to heat, attention should again be directed here to the physiologic effects of the latter, referred to in the section "General Considerations."

It would appear that massage partakes somewhat of the nature of exercise, but studies from the chemical standpoint show that this is not wholly the case. In order to understand the influences of massage, it is important to consider briefly the nature of the response of the body economy to exercise. Actively contracting muscles bring about the production of lactic acid in amounts sufficient to change the reaction of the blood; true acidosis develops. The increased acidity thus induced may persist for as long as fifty minutes after an amount of exercise equivalent to 3,500 kilogram meters in three and one-half minutes. This is about comparable to the amount of exercise taken by a man weighing 150 pounds (68 Kg.) climbing a hundred and fifty steps at the rate of one step a second.

After massage given as vigorously as was clinically practicable to persons unaccustomed to it there developed none of the evidences of acidosis that follow active exercise or the evidences of alkalosis that follow systemic exposure to heat. There was no increase in organic acids such as would have presumably occurred had lactic acid been produced and eliminated as it is during exercise. After massage of considerable severity the hydrogen ion concentration of the blood showed no change comparable in magnitude to that following exercise.

Massage is accompanied, therefore, by neither the alkaline swing following systemic exposure to heat nor the acid swing following active exercise.

Light pressure produces an almost instantaneous, though transient, dilatation of the capillary vessels, although heavier pressure may produce dilatation of more enduring nature. Microscopic observation of fields in which only a few capillaries are open, and hence in which only a few can be seen, reveals that pressure of this kind may cause practically all the smaller vessels to become visible because of the blood flow created through them.

After massage there are an increased rate of blood flow and a change in the vessel wall, which is evidenced by the "sticking" and emigration

of leukocytes. Massage is thus accompanied or followed by an increased interchange of substances between the blood stream and the tissue cells, with an altered and presumably improved tissue metabolism.

It is not difficult to recognize in a gross way clinically the possible mechanical influence of massage in returning fluid from the fixed tissues to the general circulation. When the clinician determines the presence of edema in the lower limbs by pressing with a finger to induce pitting, he is really carrying out on a small scale the principles of massage. If these principles are applied on a large scale and skillfully, the fluid so displaced is returned more easily to the circulation for removal through the kidneys. The influence of massage here described has application, in conjunction of course with other measures, to cardiac dysfunction accompanied by peripheral edema and also to the low grade tissue edema seen frequently with chronic arthritis.

The beneficial effects accruing to the patient with arthritis from massage are exerted partly through the lymphatics involved, but it would be improper to suppose that the general effects of massage on the circulation are brought about through mechanical agencies alone. There can be small doubt that the nervous system contributes under massage, probably through the sympathetic division, to a reflex influence on the blood vessels of the parts concerned.

It must be borne in mind that a necessary consequence of dysfunction of muscle tissue, for which massage is often indicated, is the production in the muscle of some of the products of dysfunction. Massage is capable of promoting the removal of some of these substances, as is well exemplified in its influence on the extravasations of blood and other debris consequent on traumatization of muscle or other tissue.

In this connection it is important to point out that in many debilitating states, such as chronic arthritis, it is possible to expedite removal into the blood stream of the products of faulty metabolism to such an extent that toxemia with fever may be induced. Great care, therefore, must be exercised under such circumstances to avoid overtreatment, especially with elderly people.

In connection with arthritis, local massage can usually be preceded with profit by the application of heat to the involved part.

Under nearly all circumstances, massage for arthritis should be directed to the neighborhood of joints rather than to the joints themselves and should be unaccompanied by movement of the joints. "Churning" of the joint is to be studiously avoided. One of the commonest errors made by masseurs in general is that of inducing twisting movements in the joints of the finger or in other joints, together with passive flexion and extension of nearly all involved joints. Subsiding arthritis may easily be perpetuated or made worse by activities of this sort.

Therapeutic Massage.—There are four main types of therapeutic massage. To secure relaxation, the patient should always be recumbent even when massage is being given to an extremity.

1. *Superficial Stroking Massage:* This consists of the passage of the hand over an area of the patient's skin with a slow, gentle and rhythmic movement. This aims to produce only a reflex effect. To secure this effect the pressure must be extremely light and each movement must be repeated in the same direction.

2. *Deep Stroking Massage:* The aim of this form of massage is to empty the veins and lymphatics and to press their contents in the direction of the natural flow. It is essential to have the patient's muscles relaxed, to take advantage of gravity, to make the movements deep but not heavy and to make them always in the direction of the venous flow. The hand of the operator must be adapted to fit the contour of the area being treated.

3. *Kneading Massage:* This consists in grasping, wringing, lifting, rolling or pressing a part of a muscle or a muscle group. This form of massage aims to assist venous and lymphatic circulation, to stretch retracted muscles and tendons and to aid in stretching adhesions. The essentials in kneading massage are the same as those set forth for deep stroking massage.

4. *Friction Massage:* This consists in pressing deeply on the part under treatment and passing the hand in a circular direction, moving the superficial over the underlying parts. The effect of friction is to free adherent skin, to loosen scars and adhesions of deeper parts and to aid in the absorption of local effusion. Friction is an important massage manipulation around joints and for small areas, such as the hands, feet and face.

SPRAINS AND DISLOCATIONS

Local applications of cold with rest, proper compression bandaging and elevation are indicated for immediate treatment. Later, splints or bandages (including plaster of paris bandages) should be removed and replaced after the daily treatment by heat from an electric lamp baker or a whirlpool bath followed by massage. On the whole, fixation by a removable plaster splint and daily application of heat and massage are to be preferred to strapping with adhesive plaster, which does not permit recourse to physical therapy.

TRAUMATIC SYNOVITIS

During the acute stage hot applications and splints or mild traction should be used to immobilize joints motion of which causes pain. After the first stage, of acute inflammation, lasting from one day to

possibly a week, the secondary stage, of absorption of effusion and restoration of function of the joint, begins. During this stage, heat and massage are vitally important in aiding these processes.

CONTUSIONS AND MUSCLE STRAINS

Means of treatment similar to those used for traumatic synovitis are valuable also in case of contusions or muscle strains to secure absorption of the products of hemorrhage, to eliminate swelling and pain and to secure restoration of function. Collections of blood if not absorbed may form hematomas, with possible calcification, or may be infected through the blood stream and become abscesses. It is important, therefore, to secure an early absorption of blood clots and so lessen the amount of scar tissue which forms among the muscle fibers and permit closer approximation of the ruptured fibers.

A common injury of this type is rupture of some of the fibers of one or more of the muscles of the calf of the leg. This injury should be treated by splinting the foot with the heel elevated in order to relax the achilles tendon and by binding the leg with a firm dressing of adhesive plaster to give support to the muscles. The patient is instructed not to bear any weight on the ball of his foot for at least three weeks. At the end of a week application of heat and massage of the muscle of the calf are begun.

When a ruptured tendon or muscle has been operated on, heat and massage are essential for several weeks in order to prevent fibrosis and to restore proper movements of the tendons.

Practically all patients with injury of a muscle are benefited by heat, massage and active and passive movements at some time or other during the course of recovery.

VOLKMANN'S ISCHEMIA (CONTRACTURE)

In the nonsurgical treatment of this condition, improvement is often obtained by gentle continuous stretching of the contractures by splinting. Heat and massage constitute one of the best means available for assisting in the repair of the damage that has been done and to prevent so far as possible the subsequent contractures that result. Careful stretching of the contracted muscles should be performed. The treatment should progress as rapidly as possible to active assisted exercises and then to active free motion.

BURSITIS

This condition, often seen about the elbow and the shoulder joint, for example, and resulting from acute or chronic strain, is susceptible to improvement or cure by heat and massage.

During the acute stage, when the pain is severe and the muscles are irritable, it may be best to immobilize the part temporarily and to apply moist or dry heat until this irritability has subsided.

In general, it may be said that for these conditions heat, massage and exercises are usually begun after the acute inflammatory reaction has disappeared.

NONSUPPURATIVE TENOSYNOVITIS

Tenosynovitis is seen most commonly in the extensor tendons that move the fingers and the wrist. It must be treated by splinting to immobilize the tendons and by applying heat. This is continued as long as any symptoms of crepitation, pain and weakness persist. Massage is contraindicated.

FRACTURES

General Considerations.—The effectiveness of treatment of fractures today cannot be based solely on securing union of the fractured bone or bones, for the rapidity with which the patient is returned to work and the extent to which function is restored must also be taken into consideration. At the present time it is generally conceded that a fracture should be treated as a surgical emergency and reduction carried out at the earliest possible moment and adequate fixation immediately applied with local or general anesthesia.

The proper after-care of a fracture consists principally of maintaining fixation of the fractured bone or bones until union has occurred, the early restoration of normal circulatory efficiency in the involved region and the building up of muscle tone and power so that normal use may be resumed at the earliest possible moment. Physical therapy, properly and intelligently employed, can be of inestimable service in this period of after-care in hastening recovery.

Types of Physical Therapy Useful in the Treatment of Fractures.—In order that physical therapy may be intelligently used in the treatment of fractures, it is necessary that its purposes and aims be clearly defined and recognized. They can be briefly stated as follows: (1) promoting the early absorption of hemorrhage and traumatic exudate; (2) relaxation of muscle spasm to relieve pain and discomfort; (3) reestablishment of normal circulatory conditions in the affected extremity, blood stream and lymphatics, which insures a more rapid and complete healing of the fracture, and (4) building up in the muscles of the extremity that tone and flexibility so necessary to normal use. These effects are brought about by physical agents acting on the neuromuscular and neurovascular reflex mechanisms and through the stimulation of muscles by physical means or voluntary action. Broadly speaking, there are four basic forms of physical therapy which may be employed in the treatment of fractures to accomplish the purposes catalogued.

Heat: Heat as a physical agent may be applied by a number of devices, such as a therapeutic lamp, whirlpool baths, hot packs and ordinary light bulbs set up in a cradle. To bring about the best results heat should be employed at low intensity and over a considerable period.

Massage: The type of massage most useful in the treatment of fractures is light stroking massage; the movement should be slow, even, steady and always in the same direction, that is, lengthwise of the part in the direction of venous circulation. It should be remembered that massage employed to get rid of hemorrhage and exudate and to reduce swelling acts by bringing about improved circulatory conditions and does not rub the exudate out of the part by pressure and force.

Muscle Stimulation: Muscle contractions may be produced by voluntary effort or by electrical stimulation. Voluntary contraction of muscle groups is incomparably superior to any form of artificial stimulation. Limited voluntary use is made possible by employing fixation (with traction or with hinged splints) which holds the fractured bone or bones securely but permits the guarded use of adjacent joints, by using molded plaster splints instead of circular plaster dressings and also by having the patient "set" the muscles of the injured extremity a number of times each day; such "setting" of the muscles can be carried out even when the limb is completely encased in a plaster dressing.

To avoid painful contraction some form of sinusoidal current may be used. The Council on Physical Therapy will furnish a design for making a faradic sinusoidal coil. This coil produces a sinusoidal current which will give graduated muscular contractions as described by Bristow and Smart. The value of these contractions is primarily the increase in circulation in the muscle.

The Reduction Period.—Practically, physical therapy can play but a minor role in the reduction period. However, when for any reason it is impossible to proceed with the immediate reduction of a fracture, even if the delay is but a few hours, heat and gentle massage may be used to advantage.

The Postreduction Period.—It is in the immediate postreduction period that exudate and hemorrhage which will become organized into scar tissue about the muscles, tendons, vessels and nerves and will interfere with the movement of the joint can largely be removed by restoring normal circulatory efficiency to the part as early as possible.

It is quite true that the institution of physical therapy at this time is often difficult because the part is encased in a fixation dressing, but by the use both for bed and for ambulatory patients of traction which allows ready access to the part for physical therapy, by the use of apertures in plaster dressings, by the use of hinged splints which allow movement in adjacent joints without disturbance of the fracture site, by the use

of open splinting and by frequent "setting" of the muscles, it is usually possible in most fractures to use heat, massage and muscle contraction throughout the period of fixation to the great advantage of the patient. So-called open splinting has in recent years been used more and more in the fixation of fractures; this permits the employment of physical therapy to a satisfactory extent.

In addition to "setting" muscles in this postreduction period, active muscle contraction may be encouraged in several ways. Even with the forearm and arm encased in a circular plaster splint, if the fingers are free the patient can exercise the muscles of the forearm extensively by squeezing and relaxing his grip on a rubber sponge.

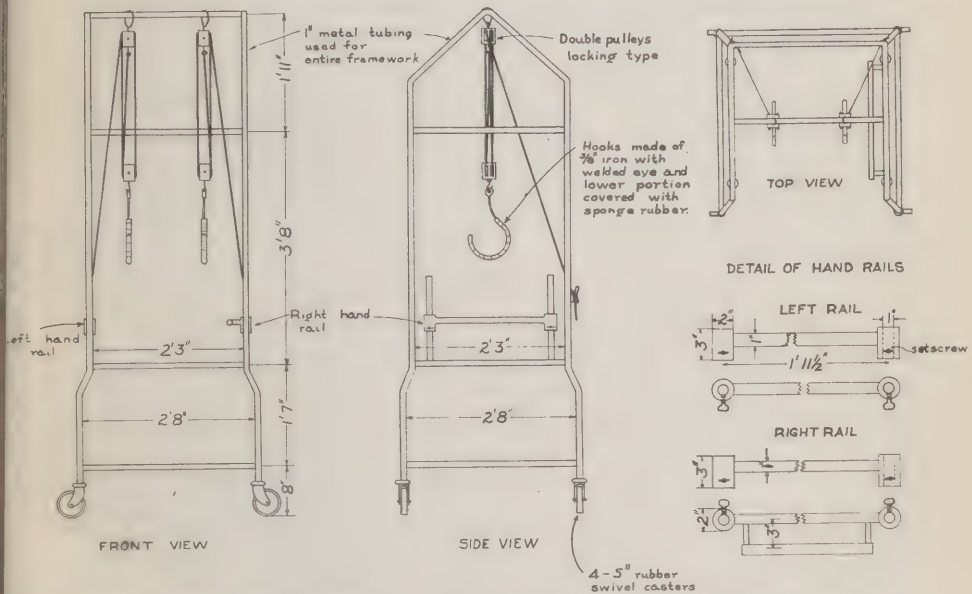


Fig. 4.—Plan for a walker to assist in the reeducation of certain patients in walking.

The Period of After-treatment.—The role of physical therapy in the after-treatment of fractures may be stated to be helping the patient to regain voluntary use of the muscles and voluntary control of impaired joints of the injured extremity. Heat, massage and muscle stimulation can reduce swelling; can decrease pain, soreness and stiffness in weak and degenerated muscles; can improve vascular and lymphatic circulation; can stimulate neuromuscular and neurovascular impulses, and can, in brief, make it easier for the patient to use the impaired part and to build up voluntary control. They cannot, however, make him well. The patient, in the last analysis, is master of his fate, and physical therapy is but the tool which enables him to carve out his recovery with

the least discomfort, with the greatest speed and to the fullest extent. It is active use of the extremity carried out by the patient himself which completes the recovery.

The movements which are used should be designed to bring about normal action of the joint in the most natural manner. Having the patient go through the motions of brushing the air after fracture of the elbow, driving nails with a light hammer after fracture of the wrist, turning a door handle after fracture of the forearm and reaching for objects placed at a gradually increased height after fracture of the shoulder illustrate the methods which may be used to encourage the patient to use the extremity in a normal manner.

Role of Occupational Therapy.—Occupational therapy of the functional type is chiefly valuable because it supplies a real incentive for the patient to use the impaired part. A definite task is given to him to perform, and in spite of himself he becomes interested in completing it, with the result that he is inspired to renewed effort and unconsciously develops the attitude of mind which is necessary for recovery. Occupational therapy is a useful way of overcoming the subconscious resistance of the patient to normal use of an injured part for fear he will suffer a relapse.

PERIPHERAL NERVE INJURIES

Proper splinting, heat, massage, electrical muscle stimulation and under-water and muscle reeducation exercises are the usual physical agents used for peripheral nerve lesions. Heat and massage are used to improve circulation, which thus lessens congestion and a tendency to fibrosis. In peripheral nerve injuries the flaccidity of the muscle deprives the blood vessels of the natural protection given them by proper muscle tone, and as the arterioles are extremely delicate it is easy to overdo the massage, produce paralytic dilatation of these arterioles and increase the condition one is striving to overcome. Therefore, the massage should be delicate and given for a short period, and the paralyzed muscle should not be pressed between the fingers or against the bone. The treatment here is the daily application of heat, proper massage with gentle stroking and kneading of small areas and passive joint motions to prevent joint stiffness. Electrical muscle stimulation is an aid which when overused causes the same effects as overuse of massage. Two or three contractions of each muscle daily is ample. Again, it is important to remember that there is no muscular protection for the delicate vessel walls and only the most gentle manipulations are essential. All deep kneading, compressing and vibrating movements are contraindicated. Even in the stroking movements, care must be taken not to compress the muscles against the underlying bone.

Massage in itself is ineffective unless there is proper splintage to prevent the healthy muscles from contracting and the paralyzed muscles

from overstretching. Massage should not be allowed to replace muscle reeducation movements, as muscle strength is increased only by active exercise.

STIFF JOINTS

Exclusive of cases of bony ankylosis or cases in which there are pathologic contraindications, massage, exercise and continuous traction or stretching by splints have an important place in the treatment of stiff joints. Adhesions inside or outside such a joint occur in great variety and in a large number of cases are susceptible to gentle stretching.

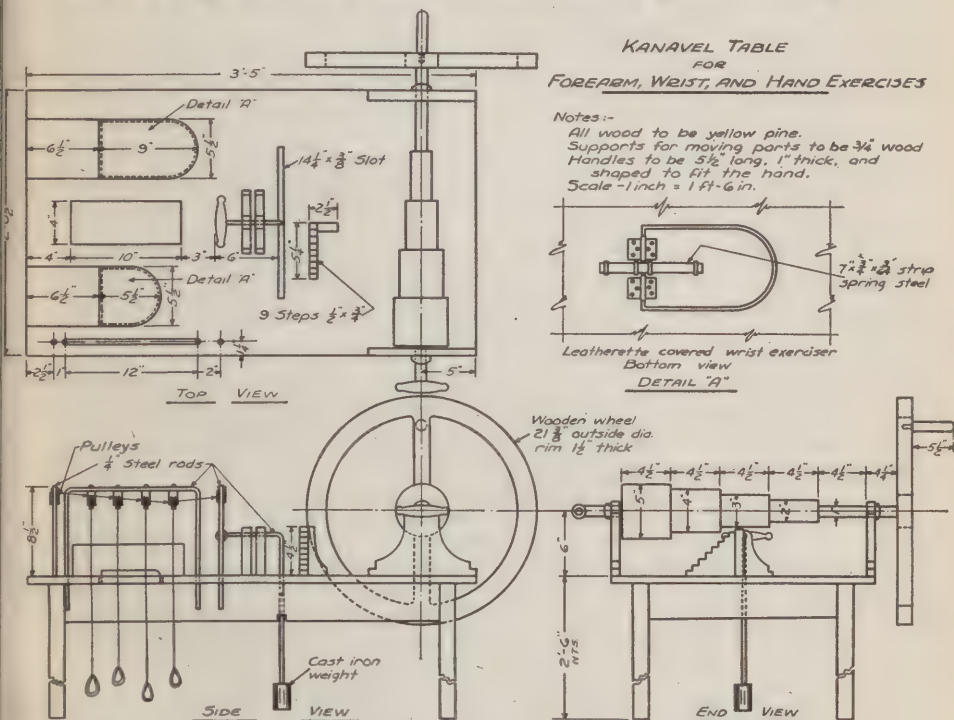


Fig. 5.—Plan for a Kanavel table for exercising the forearm, wrist and hand.

For this type of stiff joint, deep stroking massage, followed by deep kneading of the muscles above and below the joint, is used. Some one of the methods of heating the limb should precede these manipulations. Friction massage is indicated immediately over the joint. The fingers should work over all the joint, pressing the infiltrated areas and scars. After massage resistive exercises and active movements are used.

It is important to remember that heavy massage, exercises and movements may cause some reaction, but if the pain from this passes off in an hour it is not detrimental. If it persists longer and there is an increased swelling, injury to the ligaments, muscles and vessels has

undoubtedly occurred, with effusion which may organize into more adhesions. In such an event massage and exercises should be abandoned, the joint put at rest and heat applied until the reaction has passed. Then the efforts should be resumed with less vigor.

In the treatment of stiff joints the patient often expects too much of massage and heat. Active exercise and proper splinting are more important, and it must be explained to the patient that these agents are to be used in spite of temporary discomfort. Proper splinting with continuous traction is of great value and must not be neglected.

AMPUTATIONS

Heat, massage and exercise play an important part in preparing the stump of an amputated limb for early and efficient function.

Heat.—In stumps of recent amputations the local circulation is usually diminished and may be increased by heat applied locally at the moderate temperature of 96 F. for twenty minutes every two or three hours. At no time should this temperature be exceeded in amputations for diabetes or for peripheral vascular disease. Radiant heat is applied by an infra-red generator or by an electric lamp "baker." While heat used locally is the most potent vasodilator, it is fraught with danger when employed over areas of diminished circulation. It is safer to use a cradle at the root of the limb or over the abdomen; this will result in the same increase in circulation within the limits of the capacity of the diseased vascular bed.

Several types of baths (contrast and whirlpool) are used in applying heat to the stump to aid in the control of inflammation. Ordinarily, hot baths should not be used routinely because they soften the skin and thus delay prosthesis.

Massage.—In stumps healing without complication, massage should be started six or seven days after amputation.

When massage is given the patient is recumbent with the stump placed so that all the muscles are as relaxed as possible. The application of some form of heat usually precedes the treatment, which is given for ten to fifteen minutes daily. Massage should not be used in the presence of infection.

Exercise.—All exercises are prescribed by the surgeon. As the condition of the stump permits, the physical therapist instructs the patient in the various exercises and supervises a regular exercise period.

Unless there is some contraindication, the patient is directed by the surgeon while the dressings are still in place, a week or ten days after amputation, to pound the end of the stump gently with the palm of his hand. The force and number of blows increase as rapidly as the condition of the stump permits.

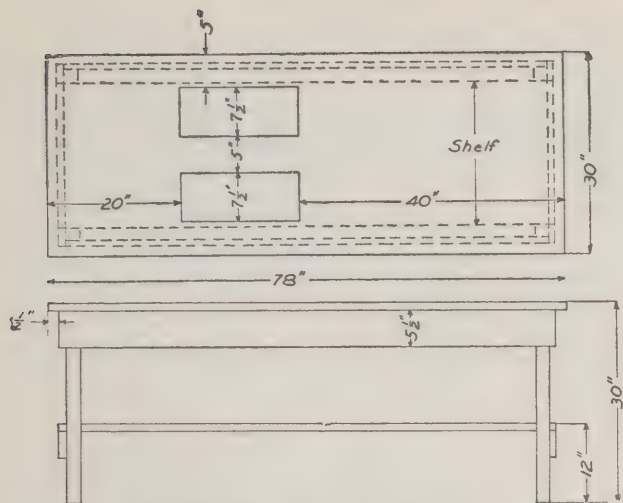


Fig. 6.—Plan for a massage table. All the boards are $\frac{3}{4}$ inch (1.9 cm.) thick, and the legs measure 2 by 2 by $29\frac{1}{4}$ inches (5 by 5 by 74 cm.).

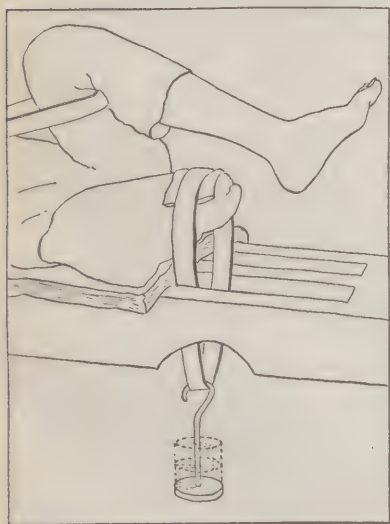


Figure 7



Figure 8

Fig. 7.—A method of applying traction for contractures which limit the extension of the hip after amputation through the upper third of the thigh.

Fig. 8.—Apparatus for shoulder abduction exercises after arm amputation.

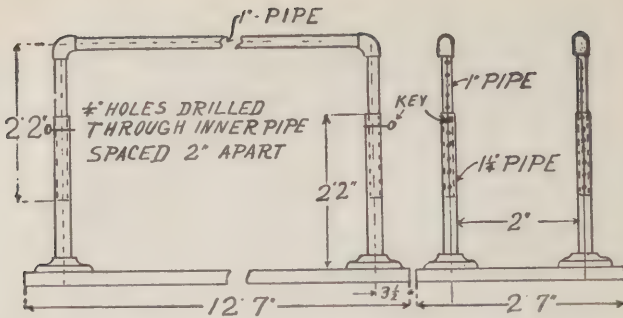


Fig. 9.—Plan for adjustable parallel bars to be used for walking reeducation.

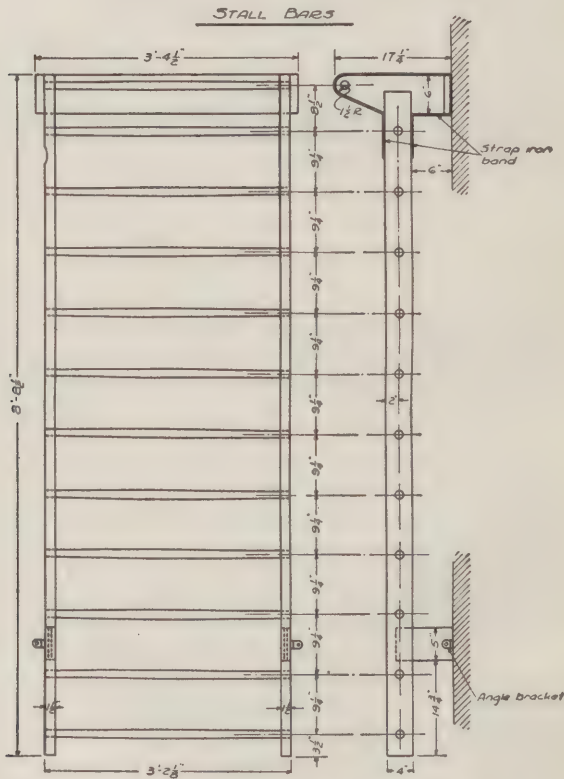


Fig. 10.—Plan for stall bars to be used as a means of exercise by patients who have undergone leg amputations. All of the wood should be white oak of grade 1. The rungs should be tapered to 1 inch (2.5 cm.) diameter at each end and $1\frac{1}{4}$ inch (3 cm.) diameter in the center, and all surfaces should be smoothly finished and polished. The scale of the plan is an inch to the foot (2.5 cm. = 30 cm.).

For efficient use of an artificial limb the strength of the muscles in the remaining part of the amputated extremity must be equal to the muscle power of the opposite normal member. Active exercise is the means by which muscle strength of the stump is increased, and application of such exercise diminished the two great difficulties accompanying the use of an artificial limb—limitation of motion of the joint and

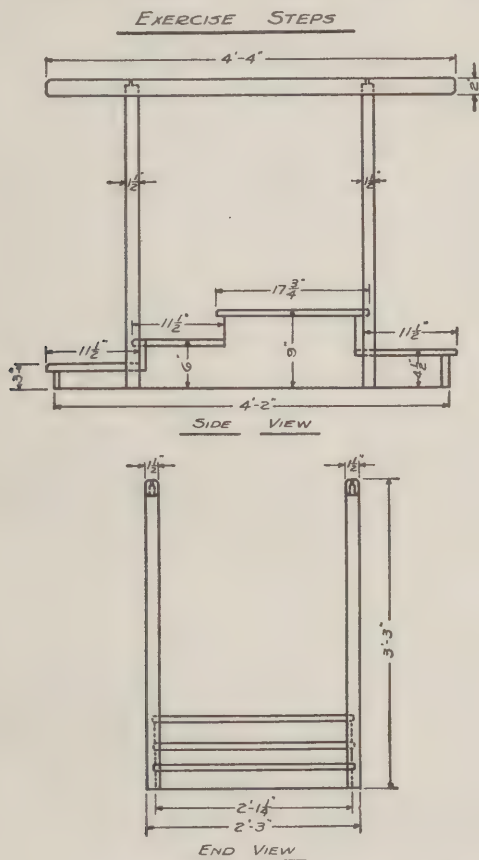


Fig. 11.—Plan for exercise steps to be used by patients who have undergone leg amputations. All of the wood should be select yellow pine, and unless otherwise specified all boards should be $\frac{3}{4}$ inch (1.9 cm.) in thickness. All exposed edges should be neatly beveled. The scale of the plan is an inch to the foot (2.5 cm. = 30 cm.).

weakened muscles in the stump. Active exercise can be started within a few days after operation.

Definite directions should be given for active and resistive exercises, which should be performed at least four times a day.

Arm Amputation: Abduction exercises for the shoulder prevent atrophy of the deltoid and the supraspinatus muscles and external rotation prevents atrophy of the infraspinatus and the teres minor muscle. Numerous exercises can be devised for patients who have undergone amputation of the arm by using a simple apparatus consisting of a weight, a cuff, a rope and two pulleys. In this apparatus the rope is attached to the cuff fitted around the stump and passes through one pulley fastened to the wall near the floor, over the other pulley fixed to the wall near the ceiling and then to the weight.

Leg Amputations and Reeducation: Learning the mechanics of standing and walking with an artificial limb involves reeducation as to the coordination of movement in the muscles of the stump and as to the tactile, muscular and joint sensation in the remaining part of the limb. If while still in bed patients who have undergone amputation have had exercises for extension and adduction of the hip, reeducation in standing and walking is not difficult.

As a first step in learning the mechanics of using an artificial limb, the patient is taught to stand upright with his artificial leg directly under him and with his weight distributed equally on the two legs.

After learning the mechanics of walking, the patient puts them into practice by walking between parallel bars, which are used for support. When this has been mastered he is taught to walk with short steps, using two canes, and then to walk with longer steps, using only one cane. Stall bars and steps may also be used as a means of exercise.

CIRCULATORY DISEASES OF THE EXTREMITIES

Vascular Exercise.—The influence which causes a collateral circulation to increase is, fundamentally, reactionary hyperemia. Just how a generalized vasodilatation of the smaller arteries of a limb shall be secured is immaterial. It is not even certain that there is one best way for every person.

The Buerger-Allen Exercises: Position 1. Lying on his back, with a watch in sight, the patient rests his legs on an inclined plane raised to an angle of 30 to 45 degrees. He keeps them so raised until the feet are thoroughly blanched, a matter requiring, as a rule, two minutes.

Position 2. The legs are lowered and the patient sits with them hanging over the edge of the bed. While the legs are dependent, the feet and toes are put through a series of motions: The ankle is flexed downward and then upward; the foot is rocked inward (tibial muscles flexed) and then outward (fibular muscles flexed); the toes are spread (extended) and then closed (flexed). As these exercises go on, the feet become flushed. They should turn a strong pink well out on the tips of the toes, a matter requiring one to three minutes. But if they become cyanotic or painful, they should at once be elevated.

Position 3. For five minutes the patient lies supine, with the legs horizontal in bed and wrapped in a woollen blanket warmed by a hot water bottle or an electric pad. In this way the reactionary flush secured by position 2 is maintained.

The cycle is put through three to six times at one session, and the sessions are repeated two to four times each day.

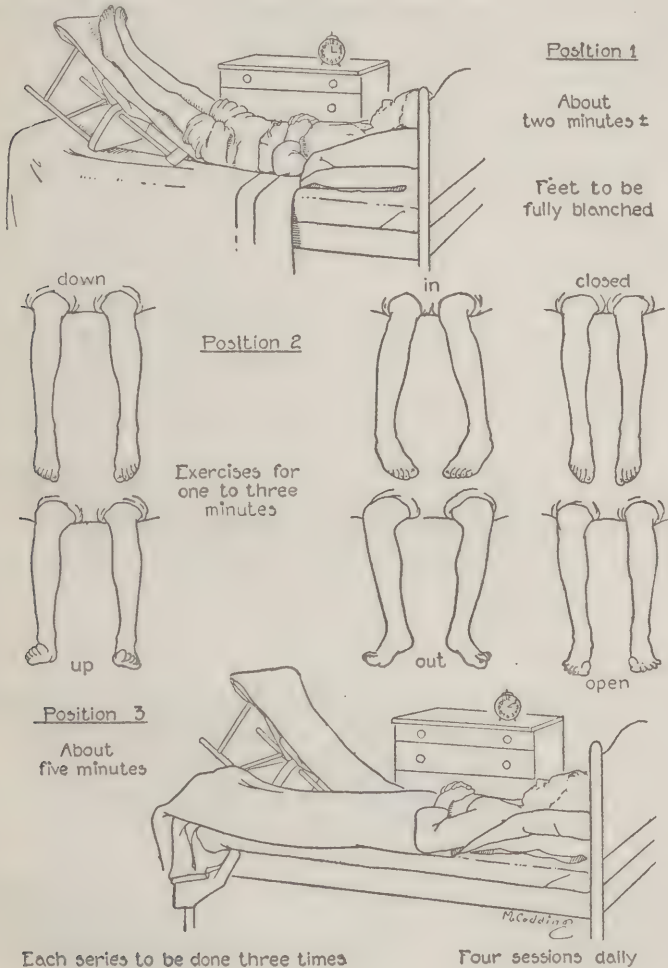


Fig. 12.—Buerger-Allen exercises (from Homans, J., *Circulatory Diseases of the Extremities*, New York, The Macmillan Company, 1939).

Vascular Exercise by Other Special Methods: Exercising devices more elaborate than the Buerger-Allen exercises include (1) the oscillating bed, (2) the suction and pressure boot and (3) intermittent venous occlusion.

PAINFUL FEET

In the condition of painful feet due to traumatism or possibly to infection, semirigid and spastic feet can frequently be made more flexible by means of physical therapy, in conjunction with the use of proper supports for the feet.

Sometimes there is so much pain from foot strain that no form of shoeing or altering of the shoe will give relief. In such instances it is best to keep the patient off his feet entirely until the pain has gone.

To prescribe exercises for a painful, uncomfortable foot which is already overburdened does not seem sound therapy. When the symptoms have been relieved, however, exercises are indicated. Too many patients become easily discouraged with foot exercises and give them up long before benefit can be expected. The reasons for this are boredom, lack of interest in prolonged treatment and too many exercises to be done at one time. If the exercises can be boiled down to one maneuver, the surgeon will get more cooperation. This one maneuver will increase the tone of the muscles that control the arch of the foot. The patient is shown how to flex all his toes strongly and, at the same time he flexes them, to adduct and invert the foot. This position is held momentarily. The contracted muscles are relaxed slowly and the contractions are repeated several times, morning and evening. One will find that in the long run more patients will perform this combined exercise than would do a dozen different exercises ten times each. It is important that the patient cultivate the habit of performing this exercise at frequent intervals, standing or sitting and with the shoes on.

BACKACHE

Physical therapeutic measures are indicated in the rehabilitation of lame backs. The indications for such a measure depend largely on the acuteness, the length and the cause of the attack.

One of the first rules in caring for a joint is to do nothing which will increase the symptoms. Therefore, all treatment should be designed to make the patient more comfortable.

Treatment of the Acutely Painful Back.—Rest: The first requirement is rest in the most comfortable position, as it helps to reduce muscular spasm in the powerful muscles of the spinal column and thus permits the back to resume its normal posture gradually.

Heat: Treatment with this agent is soothing and also helps to relax spasm and to relieve pain. Heat should be applied judiciously and for about thirty minutes at a time. Long-continued applications of intense heat defeat the purpose for which they are intended. It must be remembered that prolonged and excessive heating does not cure. Short applications of heat promote the circulation, whereas long applications

of intense heat harm muscle tone. The simplest devices for applying heat are useful, that is, the small luminous heat lamp and the hot water pack.

Daily Massage: At this time the lightest possible massage may be given if the patient will tolerate it. Exercises are contraindicated. When the more acute symptoms have abated, the massage may be increased and the patient may be up and about wearing some form of protective apparatus.

Exercises: When the acute state has subsided, when the spinal movements are not restricted by muscular spasm and when the patient can reverse his lumbar curve without pain, exercises to restore power, increase motion, restore coordination and improve posture are indicated. At first these should be simple and should be prescribed in small doses at frequent intervals.

The muscles which are most important are the gluteal and the abdominal muscles. Early exercising of the muscles of the back will not help the back, since to increase the power in these will increase the lumbar lordosis. The following exercises are recommended:

1. Deliberate firm contractions of the abdominal muscles with raising of the head, contractions of the gluteal muscles with pressing of the lower part of the spinal column against the table or any exercises producing pelvic roll are suggested. Exercises of the muscles of the lower part of the trunk will tend to restore coordination and to relieve muscular spasm.

2. For backache due to muscular injury, producing hemorrhage and muscular spasm, exercises designed to cause relaxation are used. These exercises should be deliberate and not too forceful, and should include bending of the trunk sideways and forward flexion and extension.

3. Sometimes backache is due to muscular spasm or muscular shortening, such as occurs in the erector spinae muscle, the tensor fascia lata, the hamstrings or the achilles tendons. Here the exercises should be prescribed for stretching these shortened muscles and tendons by leverage movements of the body.

These more or less specific exercises are complemented by general postural exercises, such as lying on the back, lowering the chin, dropping the lumbar portion of the spinal column and the knees to the table and raising the chest, pelvis and feet. The same effect is obtained by sitting on a chair and maintaining the tallest sitting position possible for two to five minutes or by standing against a wall, relaxing the posterior portion of the neck and the lumbar part of the spinal column against the wall and stretching the knees.

The aim of the physician should be to restore the normal physiologic curves of the spinal column, since to do so will remove the principal precipitating cause of the lame back due to bad mechanics.

TRAUMATIC CEREBRAL SPASTIC PARALYSIS

In cases of spastic paralysis, except for mild stroking and gentle kneading, massage is contraindicated, as the muscles are in a state of hypertonicity. The stroking should be firm, slow and even. The kneading is performed with the two hands on opposite sides of the limb, and the pressure should be gentle, although here the pressure may be firmer as the muscle tone is increased and there is not as much danger of injuring the muscle or arterioles as in flaccid paralysis.

It is usually advantageous in cases of cerebral spastic paralysis to precede the massage with heat and to follow it with movement. The difficulty is to secure motion without exciting spasm. The patient should then be taught to perform some voluntary movements of a simple nature. These movements can usually be best taught by the use of occupational therapy.

For adults with cerebral spastic paralysis massage and passive movements are useful adjuncts to prevent the development of muscular contraction and joint stiffness, but the patient must be made to understand that these maneuvers are not going to restore power in his limb. His participation is essential to reestablish normal impulses from the brain to the muscles. His own effort to accomplish active motion is the most essential element in his treatment. Muscle training is best carried out by rhythmic motions of both hands or both legs at the same time. This gives more symmetric synchronous movements of both extremities than does the use of only the extremity involved.

GONOCOCCIC INFECTIONS RESISTANT TO CHEMOTHERAPY

Since the introduction of sulfanilamide and its derivatives into therapy, the need for artificial fever in the treatment of gonorrhea has become less. For two groups of patients, however, fever therapy may still be desirable. These are (1) the small percentage of patients who cannot tolerate the sulfanilamide compounds because of reactions and (2) the somewhat larger group in whom the drugs do not eradicate the disease. For the latter (sulfanilamide-resistant) group, a combination of therapy with sulfanilamide compounds and hyperpyrexia has proved efficacious; for the former (sulfanilamide-intolerant) group, fever therapy alone may be employed, since the combination of fever and chemotherapy may lead to a greatly intensified drug reaction.

Acute arthritis is the gonorrheal complication which has proved to be most favorably influenced by fever therapy alone or combined with chemotherapy with sulfanilamide compounds. When combined treatment is used, a single fever session of ten hours preceded by eighteen to twenty-four hours of adequate chemotherapy appears to be the method of choice.

DEMENTIA PARALYTICA

There is still disagreement and controversy over the relative merits of malaria and artificial fever in the treatment of paresis. At present, the argument cannot be settled, and the middle point of view is that since malaria and mechanical fever are both of demonstrable value, the physician should choose that method with the use of which he is most familiar, which is most readily available and which best suits the social, financial and medical requirements of the individual patient.

In the experience of the United States Public Health Service Committee, mechanical fever gave the highest percentage of clinical remissions in patients treated with an average of sixty-nine hours of fever with a temperature above 101 F. (38.3 C.), during 70 per cent of which total fever time the temperature was above 105 F. (40.6 C.), with a maximum of 106.9 F. (41.6 C.). Equally good results were obtained by treating patients with an average of forty-four hours of fever with a temperature above 101 F. (38.3 C.), during 57 per cent of which time the temperature was above 106 F. (41.0 C.), with a maximum of 107 F. (41.7 C.). This committee has expressed the opinion that artificial fever maintained at temperatures above 106.7 F. (41.5 C.) introduces unnecessary hazards.

CUTANEOUS DISEASES

ULTRAVIOLET THERAPY

Many cutaneous diseases are definitely helped by ultraviolet irradiation. In the past many more cutaneous diseases were treated with ultraviolet rays than at present. Dermatoses benefited by this mode of therapy are briefly discussed in alphabetic order.

Acne Vulgaris.—This condition is divided into a number of clinical varieties. *Acne indurata* is common. Flushing doses of ultraviolet or solar radiation once or twice a week often cause the eruption to improve or disappear, but unfortunately recurrence is the rule. Postacne scars are improved by exfoliating doses of ultraviolet rays from a quartz mercury vapor glow (cold quartz) lamp.

Dermatitis Herpetiformis.—This condition is extremely pruritic and in many cases cannot be cured. When general body irradiation with ultraviolet rays is used in association with other methods of treatment, the pruritus may decrease and the patients are thus made more comfortable.

Dermatophytosis.—This is sometimes improved by irradiation with ultraviolet rays. Acute forms with intense inflammatory reaction may be made worse by exposure to ultraviolet rays.

Eczema Seborrhoeicum.—Occasionally irradiation with ultraviolet rays improves this condition. Patients with chronic patches are

especially helped when treated with fairly intensive doses. In general, it may be stated that ultraviolet irradiation has been of limited service in the management of this form of eczema. However, some persons with recalcitrant eruptions are helped with generalized irradiation. Chronic eczema of childhood and intertrigo are also benefited when treated with ultraviolet rays.

Erysipelas.—Good results have been obtained by applying large doses of ultraviolet rays to the affected areas. The sulfanilamide compounds cause photosensitization, and the two agents should not be used simultaneously. General systemic treatment combined with ultraviolet rays is indicated especially for children and for elderly people.

Furunculosis.—Generalized irradiation with either natural or artificial ultraviolet rays is beneficial in treating multiple recurrent furunculosis.

Neurodermatitis.—Circumscribed forms appear mostly in adults, whereas the disseminated variety occurs commonly in children. Patients with either type improve when given generalized treatments. Small doses which are applied often are better than large doses. Excessive erythema should be avoided.

Naevus Flammeus.—Port wine marks are almost impossible to eradicate. Blistering doses of ultraviolet radiation with or without compression may eradicate faint lesions or may reduce the color of the more pronounced lesions. The treatments may have to be administered for several months or years before improvement is noted.

Pityriasis Rosea.—Apparently it is exfoliation that effects the cure, and for this reason ultraviolet rays from a quartz mercury vapor glow (cold quartz) generator are preferred to other forms of ultraviolet rays. The course is certainly shortened and complications are avoided by treatment.

Psoriasis.—Ultraviolet rays in suberythema doses applied to the individual lesions of psoriasis several times a week will at times promote resolution. The results seem to be even better if the lesions are first anointed with an ointment containing 3 per cent crude coal tar. Daily irradiation of the entire body with suberythema doses of solar or artificial ultraviolet rays may control the disease but will not prevent recurrences. Ultraviolet rays from any source are distinctly helpful in most cases of psoriasis. A severe reaction, however, should be avoided.

Sycosis Vulgaris.—This chronic pustular folliculitis of the bearded region is recalcitrant. Patients are usually better in summer. Localized and general body irradiation with artificial ultraviolet rays may be of value.

Telangiectases.—This condition can be improved with carefully applied ultraviolet rays in doses sufficient to provoke a severe reaction. Only a small area should be treated at any one time.

Tuberculosis of the Skin.—Erythema Induratum of Bazin: Generalized and localized irradiation with ultraviolet rays combined with rest, proper diet and injections of tuberculin often yields good results.

Lupus Vulgaris: This disease abates when treated with ultraviolet rays. A great deal of time and patience is required, but the results often reward the effort. A combination of generalized and localized ultraviolet irradiation is generally employed.

Scrofuloderma: Satisfactory results have been observed with ultraviolet rays. As in all the tuberculodermas, best results are obtained with adequate attention to the general health, suitable diet, injections of tuberculin and daily generalized body irradiation with either natural or artificial ultraviolet rays.

Tuberculosis Cutis Orificialis: Satisfactory results have been noted when tuberculosis of the orificial mucous membranes has been treated with ultraviolet rays. As this form of tuberculosis is generally a terminal manifestation of visceral tuberculosis, everything possible to make the patient comfortable must be done.

Ulcers.—Irradiation with artificial ultraviolet rays or with solar rays has been helpful in some cases of indolent ulcers and wounds.

TREATMENT OF CUTANEOUS DISEASES BY PHYSICAL METHODS OTHER THAN IRRADIATION

Definition of Terms.—The physical agents used in treating dermatologic conditions are roentgen rays, radium, ultraviolet rays, medical diathermy, surgical diathermy, electrolysis, common ion transfer (iontophoresis), cautery, refrigeration and hydrotherapy. Medical diathermy and short wave therapy are used little in dermatologic conditions except for the treatment of syphilis. Surgical diathermy is employed much more frequently. The definition of terms used in this section are as follows:

1. Medical diathermy: the use of a high frequency current for medical purposes.
2. Surgical diathermy: the use of a high frequency current for surgical purposes.
 - A. Cutting current: Biterminal high frequency current obtained from the primary winding of the high frequency transformer.
 - B. Electrocoagulation: Biterminal (and at times monoterminial) high frequency current obtained from the primary winding of the high frequency transformer.
 - C. Electrodesiccation: Monoterminial high frequency current obtained from the secondary winding of the high frequency transformer.

Electrolysis.—A current suitable for electrolysis may be obtained from dry cells. The voltage employed for electrolysis is $22\frac{1}{2}$ volts, and the milliamperage is usually from $\frac{1}{4}$ to 2 milliamperes. Devices for use with commercial direct and alternating currents are also available. A cheap, convenient and satisfactory apparatus may be made from specifications furnished by the Council on Physical Therapy. The active negative electrode is a needle which is exceedingly thin and has a blunt end.

Cauterization.—The actual cautery consists of a red hot or white hot object which may be heated in a flame or kept constantly heated with an electrical device (thermocautery, electrocautery or galvanocautery).

Refrigeration.—Refrigeration is an important and useful method of treatment for many dermatologic conditions. Ethyl chloride spray is used for freezing prior to minor surgical operations and for destroying larva migrans.

Solid carbon dioxide (commercial dry ice) is the most frequently used freezing agent. When dry ice is not available all that is required for manufacturing solid carbon dioxide in the office is a tank of carbon dioxide and suitable tubes or a special apparatus for its collection.

Balneotherapy.—Balneotherapy, which is a dermatologic term referring to the use of medicated baths and dressings wet with various solutions, is extremely valuable, especially in the treatment of extensive and inflammatory dermatoses.

Cutaneous Diseases Responding Well to Physical Therapy.—Many cutaneous diseases respond exceedingly well to physical agents. A short description of the technic for treating each of these dermatoses follows. The diseases are arranged alphabetically.

Adenoma Sebaceum.—These lesions are best treated with electrolysis, with superficial electrodesiccation or with applications of solid carbon dioxide.

Clavus.—Soft or hard corns usually result from the wearing of improper shoes. The use of salicylic acid plaster is generally sufficient to clear up these lesions. Occasionally it is necessary to destroy a clavus with electrodesiccation.

Cornu Cutaneum.—Cutaneous horns are precancerous lesions, and as soon as they are diagnosed they should be completely destroyed with electrosurgery with the affected area under local anesthesia.

Cysts.—Mucous retention cysts may be excised or destroyed with electrosurgery. Sebaceous cysts are best excised.

Fibroma.—Soft or hard pedunculated or sessile fibromas may be treated with electrosurgery or with electrolysis. It is inadvisable to

excise or to destroy fibromas occurring in cases of Recklinghausen's disease, because sarcoma may follow such treatment.

Granuloma Pyogenicum.—Electrosurgical destruction of lesions with the affected areas under local anesthesia is the best method of treating this disease.

Hypertrichosis.—The only practical and permanent method of safely removing superfluous hair is with electrolysis or light electrocoagulation.

Keloids and Hypertrophic Scars.—In certain cases keloids and hypertrophic scars may be improved or eradicated by the combined use of roentgen rays or radium with surgical methods. Massage may be of some value in the treatment of hypertrophic scars. Properly applied solid carbon dioxide also has been found to be valuable in some cases.

Keratosis.—Keratosis resulting from the administration of an arsenical, from seborrhea, from senility and from irradiation are best destroyed, with or without local anesthesia, by electrodesiccation. Solid carbon dioxide and thermocautery may also be used.

Leukoplakia.—Leukoplakia is a precancerous cutaneous condition. Quiescent lesions require only careful observation. The proliferating verrucous and actively growing areas are best treated with electro-surgery.

Malignant Growths.—Many of the cutaneous malignant growths are treated with electrodesiccation. Some of the squamous cell epitheliomas are destroyed with electrocoagulation or with electrocutting, which is followed up with roentgen or radium therapy. Before attempting to treat cancer of the skin one should be thoroughly familiar with all the methods used.

Nevi.—There are several varieties of moles, and the appropriate management will be described under each type.

Angioma Cavernosum: The superficial variety (strawberry mark) can be destroyed by refrigeration, electrodesiccation and excision. The best results, however, are obtained with properly applied radium or roentgen rays. The deeper and larger lesions also respond best to roentgen or radium irradiation but may be destroyed with solid carbon dioxide or by electro-surgery. Sclerosing solutions also yield excellent results. Treatment should be instituted at the earliest possible time.

Naevus Araneus: These lesions may be destroyed with electrolysis or with light electrocoagulation, without scars.

Naevus Flammeus: There is no satisfactory treatment for this condition. Carefully applied solid carbon dioxide may improve the appearance of some lesions.

Naevus Unius Lateris and Naevus Verrucosus: These nevi may be treated with surgical excision, electro-surgery, electrolysis or with solid

carbon dioxide. The method selected will depend on the type of lesion to be treated. Correct diagnosis is essential because these lesions often simulate malignant growths.

Pigmented Nevi: Moles may be benign or malignant. Treatment depends on the type. The ordinary common mole with hair, light to dark brown in color, may be destroyed with electrolysis, solid carbon dioxide or electrodesiccation. Before any of these methods is used, the hair should be removed with electrolysis or with electrocoagulation. Disfiguring scars should be avoided. Good results are obtained in treating flat pigmented moles without hair with solid carbon dioxide.

Senile Angioma: Senile angiomas may be destroyed with electrodesiccation.

Rosacea.—The dilated visible cutaneous vessels are destroyed with electrolysis. Properly applied electrosurgery improves the hypertrophy of the nose which sometimes follows rosacea (rhinophyma).

Scleroderma.—Massage with cocoa butter is sometimes useful. Common ion transfer (iontophoresis) with mecholyl chloride (acetyl-beta-methylcholine hydrochloride) has been found to be useful in the treatment of this condition.

Telangiectases.—Dilated superficial blood vessels from any cause may be permanently destroyed by electrolysis or by light electrocoagulation. Scarring should not result from this treatment.

Tuberculosis of the Skin.—Lupus Vulgaris: Small discrete lesions can be destroyed with electrodesiccation or the actual cautery. When extensive areas are affected, these destructive methods are impractical. Other general measures are more efficacious.

Sarcoid of Boeck and of Darier and Roussy: These lesions may be destroyed with electrodesiccation, solid carbon dioxide or electrocautery. If they are extensive, general methods of treatment are preferred.

Tuberculosis Verrucosa Cutis (Verruca Necrogenica; Warty Tuberculosis of the Skin): The lesions are generally solitary and small and are therefore amenable to treatment with destructive methods, electrosurgery being the one of choice.

Verrucae.—Condylomata Acuminata (Venereal Warts): Warts appearing around the genitals are best destroyed with electrosurgery with the use of local or proper general anesthesia. (Avoid explosive anesthetics.)

Verruca Plana: Flat warts occur mostly in children and young adults. They affect the face, hands and forearms. Electrodesiccation without anesthesia, cauterization and the application of solid carbon dioxide are all suitable methods of treatment.

Verruca Plantaris: Plantar warts are painful, and some are best destroyed by means of surgical diathermy with the area under procaine hydrochloride anesthesia. Solid carbon dioxide is sometimes used.

Verruca Vulgaris: Small warts may be electrodesiccated without using anesthesia. Larger warts should be anesthetized before electro-surgery is instituted. They should be differentiated from lesions that have a clinical appearance of benign lesions but may be dangerous. Disfiguring scars should be avoided in the treatment of lesions which are benign and only of cosmetic importance.

Xanthoma; *Xanthoma Palpebrarum*; *Xanthoma Tuberosum Multiplex*.—These lesions may be treated with trichloroacetic acid, solid carbon dioxide, electrodesiccation or excision.

TUBERCULOSIS

Pulmonary Tuberculosis.—For uncomplicated pulmonary tuberculosis there is no clinical evidence to prove the indication for therapy with ultraviolet rays, and in this disease, even in quiescent forms, harm has been done by exposure to sunlight especially with too intense and prolonged irradiation. Solar heat alone, especially in summer, can prove exhausting.

Pleurisies.—When these conditions occur in the course of obvious pulmonary tuberculosis as well as in cases of pneumothorax, they offer the same indications as does the pulmonary form of the disease. Tuberculous empyemas do not respond.

Laryngeal Tuberculosis.—This condition is practically always secondary to pulmonary tuberculosis, so that the indications for the treatment of the larynx depend on the nature of the disease in the lungs. Local treatment of the larynx is used in addition to the enforced rest and the hygienic regimen. Such local measures in particular include absolute vocal rest (silence), local medications and sprays and local application of the galvanic cautery. General ultraviolet ray exposures are made to the body, with at times additional laryngeal local exposures. The acute forms of laryngeal tuberculosis, particularly those with edema, are not indications for ultraviolet irradiation.

Tuberculosis of the Lymph Nodes.—This condition may be seen clinically in three different stages, namely, as enlarged nodes which have undergone hyperplasia, as nodes which have proceeded to the stage of caseation and softening or as softened nodes which have perforated to the exterior through a sinus tract. In the first stage, general body exposures to repeated erythema doses of ultraviolet rays are not infrequently followed by an inflammatory reaction at the nodes with slight pain, tenderness and swelling. In the majority of cases the inflammation

subsides and the lymph node finally heals. About 30 per cent of nodes appear to show no tendency to heal under ultraviolet irradiation alone, but with the addition of roentgen rays a large number will improve. Occasionally, nodes in the hyperplastic stage may become caseous under treatment at this stage with ultraviolet rays and may have to be treated surgically by excision. Under such circumstances these rays are of great value when used postoperatively in preventing the formation of tuberculous sinuses. In the second stage of caseation, ultraviolet irradiation alone will frequently bring about resolution. When softened lymph nodes reach the stage of fluctuation, aspiration or incision is necessary, and then ultraviolet irradiation is most effective. In the third stage, excellent results are obtained in clearing up sinuses of long standing, but occasionally roentgen ray exposures may have to be combined with ultraviolet irradiation for complete healing to take place. Local irradiation of the sinus area should augment general irradiation of the body.

Secondary Ulcerative Intestinal Tuberculosis.—This is the most frequent complication of pulmonary tuberculosis, occurring in 50 to 80 per cent of the patients who die of pulmonary tuberculosis. Artificial ultraviolet ray and solar ray therapy, as well as a diet rich in vitamins, should be used in most cases, as they frequently relieve the symptoms and bring about recovery. When the desired results are not obtained by ultraviolet irradiation, roentgen treatment of the intestinal tract should be carefully given or other additional measures should be employed.

Peritoneal Tuberculosis.—In cases of this condition therapy with ultraviolet rays always deserves a trial first. The serous exudative type generally responds to ultraviolet irradiation, both in children and in adults. The dry proliferative form, usually adhesive, is more refractory.

Unilateral Renal Tuberculosis.—If the nature of this complication is recognized at the onset of symptoms and when such symptoms are slight, conservative treatment with ultraviolet rays can on rare occasions prevent the need of surgical intervention. As a rule, nephrectomy is indicated.

For unilateral progressive renal tuberculosis or bilateral disease in which the more involved kidney is removed, ultraviolet irradiation is to be advised as a desirable postoperative treatment.

Bilateral Renal Tuberculosis.—Ultraviolet irradiation is indicated. It may help render the disease quiescent; its occasional analgesic action on ulcerations of the bladder is particularly welcome. Advanced tuberculosis of both kidneys and of the bladder has rarely responded to any form of therapy, especially if the patient is cachectic.

Tuberculosis of the Bones and Joints.—Heliotherapy, although not the mainstay of treatment, is employed in combination with other forms

of therapy. Orthopedic measures, rest in the open and exposure to ultraviolet rays form the basis of conservative therapy.

There are at present three definite schools of treatment, each with adherents. The first emphasizes the need for surgical intervention, especially fusion, in all cases of tuberculosis of the joints. The second school, represented by Rollier, is rigidly set against surgical intervention except in unusual instances. This school holds that light therapy combined with rest and traction can do far more than the surgeon's knife. The third school adopts a more conservative attitude and teaches that the problem of tuberculosis of the joints is too complicated to be solved by one mode of attack and that in each instance numerous fine differentiations must be considered. Operative treatment, heliotherapy, therapy with artificial ultraviolet rays, braces and in some cases plaster of paris fixation all have their place in the treatment of tuberculosis of the bones and joints.

PSYCHIATRY AND NEUROLOGY

In treatment of the psychoses and continuous bath, cold wet packs, gymnastic exercises and games have their uses, especially for conditions due to excitement.

In treatment of the psychoneuroses short courses of massage, cabinet baths and hydrotherapy are sometimes indicated to combat fatigue. The wet pack has been of use in combating insomnia. With all forms of neuroses, however, it should be definitely understood that physical therapy is only a small part of the total treatment.

In cases of neurologic conditions electrical stimulation, massage, passive and active exercise, dry heat, hydrotherapy and fever therapy have long been utilized to relieve pain, to influence the metabolism of affected parts, to prevent muscular atrophy and to promote early return of function. Physical therapy for these conditions should not be undertaken without a thorough study of indications and contraindications, which will be found in the special articles and the larger treatises dealing with the different neurologic disorders.

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OCCUPATIONAL THERAPY

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AND

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INTRODUCTION

The psychologic and physiologic value of normal activity in work and in play is well recognized. The human machine is at its best in activity. If mental and physical activity contributes to the maintenance of well-being, it is even more vitally necessary when there is a deviation from normal.

This principle was clearly stated by Raycroft,¹ who said:

The essential characteristic of life is activity—change—movement—achievement—action and reaction with environment. These are a fundamental process. Any organ or function, whether physical or mental, whether a group of muscles immobilized in a cast or the process of reasoning deadened by a disordered mental condition, tends to deteriorate until it is no longer recoverable.

It is only through *activating the patient himself* that normal processes and powers can be retained or improved and the symptoms of his disease can be influenced.

Therefore activity therapy operates in harmony with physiological and psychological laws and serves as a stimulus and director in the work of returning the patient, *through his own efforts, interest and will*, back to normal patterns of life and expression.

DEFINITION OF OCCUPATIONAL THERAPY

Occupational therapy is an objective type of treatment prescribed by a physician to hasten a patient's recovery from disease or injury or to contribute to his adjustment to hospitalization.

The occupational therapist is professionally trained to carry out the physician's prescription through the selection and adaptation of activities which meet the patient's physical and psychologic needs. The activities used as treatment must be sufficiently interesting to the patient to motivate him to active participation.

The therapist also provides the physician with information regarding the patient's symptoms, reactions and progress while under observation.

SCOPE OF OCCUPATIONAL THERAPY

Preventive or Diversional Therapy.—This type of occupational therapy comprises simple, prescribed activities, including recreation, which serve to induce rest, to control general exercise, to prevent neuroses and to sustain morale.

Functional Therapy.—This type comprises prescribed activities intelligently planned to assist in the restoration of articular and muscular function, to improve the general condition, to build up physical endurance and to aid in mental rehabilitation and the treatment of mental disorders.

1. Raycroft, J. E.: Occupational Therapy, *Occup. Therapy* **18**:241 (Aug.) 1939.

Prevocational Therapy.—This type comprises prescribed work or work processes planned to prepare a patient for return to his former employment or for vocational education.

EFFECTS ON THE PATIENT

Mental Effects.—Occupational therapy (*a*) has a normalizing influence—it is natural for man to be occupied, (*b*) eases emotional stress and restlessness, (*c*) gives an outlet for repressed energy, (*d*) arouses and develops attention, (*e*) replaces unhealthy mental trends with healthy ones, (*f*) substitutes encouragement for discouragement, (*g*) conserves the work habit and prevents invalid habits and (*h*) gives an opportunity for self expression and development of initiatives.

Physical Effects.—Occupational therapy (*a*) restores function to disabled joints, (*b*) aids in repairing muscle tissue and improving muscular power, (*c*) increases blood supply and healing processes, (*d*) builds up resistance to fatigue and (*e*) develops mental and physical coordination.

Social Effects.—Occupational therapy (*a*) raises the morale of the patient, the ward and the hospital; (*b*) develops group responsibility and cooperation, and (*c*) gives opportunity for social contacts in normal activities.

Economic Effects.—Occupational therapy (*a*) detects aptitudes, skills and capacities for vocational guidance; (*b*) evaluates disability in relation to vocational requirements; (*c*) establishes industrial habits and work tolerance, and (*d*) adjusts permanently institutionalized patients to participation in hospital industries.

THE OCCUPATIONAL THERAPIST AND THE PHYSICIAN

It is essential that there be the closest cooperation between the physician and the occupational and the physical therapy department with frequent exchange of information if there is to be intelligent, effective treatment and if the patient is to be returned to normal activity in the shortest possible time. A physician's prescription is necessary for the protection of the patient and the occupational therapist. If possible, the occupational therapist should make ward rounds with the physician, so that treatment may be changed as indicated. The prescription given by the physician to the occupational therapy department on referring a patient should contain information which will lead to the intelligent care of the patient.

PROFESSIONAL STANDARDS AND SOURCES OF INFORMATION

The Council on Medical Education and Hospitals of the American Medical Association, 535 North Dearborn Street, Chicago, has formulated requirements for professional training in occupational therapy and examines schools of occupational therapy for accrediting.

The value and effectiveness of occupational therapy depend on the training and experience of the technicians, who must have a sound concept of the conditions treated and the technics to be employed. A therapist whose background training is limited to a study of crafts cannot be expected to carry out a physician's prescription adequately and intelligently.

An efficient occupational therapist's training must include the fundamental sciences which give a basic understanding of the human being and of the mental and physical diseases and injuries the therapist will be called on to assist in treating. A broad training is necessary in the field of occupations or activities applicable to the motivation of the patient and in those which may be selected and adapted to meet the specific exercise needs or to control the desired mental processes and reactions of the patient. The worker must have imagination and ingenuity in adapting processes to fill the physician's prescription and to contribute to the patient's recovery. All the available resources must be coordinated to forward the physical, mental and social rehabilitation of the patient.

In this manual only a few examples of activities applicable for specific treatments are suggested. Since each patient presents an individual and complex problem, a listing of activities might be misleading.

ORTHOPEDIC AND SURGICAL CONDITIONS

OCCUPATIONAL THERAPY AND THE PHYSICIAN

A physician is usually responsible for the supervision of both the physical and the occupational therapy department in an orthopedic service. The two types of treatment should be carefully correlated if physical recovery and psychologic adjustment are to be hastened.

A prescription signed by the physician is necessary for the protection of the patient and the therapist. This prescription is given to the therapist when the patient is referred for treatment and should contain information which will lead to the intelligent care of the patient. The following data should be included in the referral information and the prescription for functional treatment:

Diagnosis

Date of injury or onset of illness

Psychologic factors

General physical condition

Present status of injury and precautions to observe

Instructions regarding the removal of braces, casts, etc.

Physical therapy—past and present

Length of treatment period

Frequency of treatment

Specific results desired in treatment

COORDINATION OF OCCUPATIONAL AND PHYSICAL THERAPY

Orthopedic and surgical patients usually need both physical and occupational therapy ; therefore, the importance of a coordinated program cannot be too much stressed. Coordinated, the two types of therapy supplement each other in a well rounded treatment. As isolated services, they may duplicate treatment to the serious detriment of the patient.

Heat and massage prepare the injured part for active exercise. When active exercise is indicated, an activity which centers attention away from disability frequently stimulates more rapid physical gain than uninteresting exercise with attention centered on disability. Active exercise in occupational therapy should immediately follow the preparatory treatment of physical therapy. Therefore, the two departments should be close to each other and the patient's schedule so arranged that he goes directly from physical therapy to occupational therapy.

The occupational therapist should be informed regarding the plan of physical therapy for patients and occasionally observe their treatment, in order that her plans for them be well correlated with other procedures.

The physical therapist should occasionally observe the patients in the occupational therapy department, where their attention is centered away from themselves and they are off guard. Frequently they use injured parts more freely than was believed possible by either the patient or the therapist.

GENERAL CONSIDERATIONS

In cases of surgical and orthopedic disability there is necessarily a period of immobilization, but there is no reason to allow the mental and the physical fitness of a whole person to suffer. Occupational therapy may be employed to maintain maximum general physical fitness of the disabled patient while the disabled part heals. It may also contribute to the mental fitness as a preventive of neurosis, as a treatment if accompanying mental complications exist and as a builder of morale. Occupational therapy also aids directly in the restoration of function to the disabled part when exercise is indicated.

What Happens Physically?—Surgical and orthopedic disabilities often involve an otherwise normal muscular man whose whole engine is geared to carry him through a full day's active work. While he is in bed, his voluntary muscles are practically idle and his involuntary muscular system is doing but a small part of the work which it was called on to perform previous to the accident. As a result, the muscles become flabby and the circulation slows up. Occupational therapy can assist in maintaining the physiologic balance. Activities which will exercise the muscles of the uninjured parts can be begun at once, and as soon as possible other groups of muscles should be brought into action. When he is able to get about, he does not require so much time in which to

regain his usual strength and energy; thus the period of convalescence is shortened. Moreover, this generalized activity must not be overlooked later when specific activity for the disabled part begins but should be gradually increased as a means of building endurance and fitness for return to normal activity.

Conclusion: From the standpoint of general physical fitness, exercise in occupational therapy should be prescribed for the uninjured parts as soon as a patient's condition permits and should be continued in the form of graded activity all through convalescence, building physical fitness and endurance.

What Happens Mentally?—Mock² stated:

One of the commonest causes for traumatic neuroses is failure of continuous, active treatment until the surgeon is assured that his patient is well on the way to an economic end-result; that is, able to carry on once more. The diagnosis of a broken back, a skull fracture or a fractured pelvis often strikes fear and dread into the heart of the patient; yet the treatment of these conditions in a large majority of cases is comparatively simple and the end-results are extremely good. Many times treatment consists of simply putting the patient to bed and keeping him as quiet as possible for from six weeks to three months, or, in some cases, in addition to rest, of traction applied to the lower extremities. The surgeon makes his daily round satisfied with the treatment of the physical condition and the progress that is being made, and never recognizes or even dreams of the fear and anxiety that are gnawing at the patient's mind. When the day comes for the patient to leave his bed and begin to move about, the surgeon is disgusted with the lack of cooperation on the part of the patient, the unwillingness to try to help himself, and the absurdity of his complaints. . . .

All such patients, in addition to the actual surgical treatment, need properly directed physical therapy and occupational therapy, which are the logical adjuncts to the usual surgical procedures. . . . Occupational therapy . . . [keeps a patient's] mind and hands employed for a large part of the day, filling in the gaps between the surgeon's visits and the physical therapy and leaving little time for the fears and germs of traumatic neurosis to develop.

It must be realized that the shock to the nervous system from an accident or a sudden crippling disease often causes greater suffering than the actual physical disability. The importance of the psychic factor in dealing with disabled persons must be recognized.

Frequently, however, even after good surgical treatment and well directed physical therapy, patients fail to respond to treatment until their interest has been aroused and their ambition renewed by occupational therapy. Work is one of the greatest therapeutic measures and one that is often neglected. It diverts a patient's mind from his disabled state; it improves morale and wakens or renews interest in creating something, and it gives promise of future usefulness to one whose future seemed hopeless.

2. Mock, H. E., and Abbey, M. L.: Occupational Therapy, in Handbook of Physical Therapy, Prepared by the Council on Physical Therapy, ed. 3, Chicago, American Medical Association Press, 1939.

Conclusion: From the standpoint of mental fitness occupational therapy should be prescribed for an injured patient as soon as possible.

How Can Function Be Restored Most Quickly?—Normal function is restored through regular graded exercise. The sooner exercise is started, the more rapid and complete will be the return of function. Exercise must necessarily be done by the patient himself. Occupational therapy provides an incentive to exercise, centers attention objectively and thereby minimizes fear. Activities can be specifically applied and graded to increase articular motion and muscular power or control.

Conclusion: Occupational therapy should be prescribed as treatment for the disabled part as soon as exercise is permitted. Restoration of function should be emphasized as the patient's own responsibility.

SYMPTOMS TREATED THROUGH OCCUPATIONAL THERAPY

Loss of Normal Articular Motion.—This loss may be caused by disease of or injury to soft tissues, unopposed muscular spasm or tissue adaptations from prolonged immobilization.

Loss or Perversion of Muscular Function.—This may be the result of disuse (usually accompanying articular limitation) or lower motor neuron damage of the central nervous system or the peripheral nervous system, in the case of the latter damage either to a plexus or to a single nerve.

Loss of Muscular Control (Due to a Lesion of the Central Nervous System).—This may result in the following symptoms:

Spasticity, with hyperactivity of the spastic muscle, stretch reflex on attempted motion in the opposite direction and inability to relax and allow the antagonist to work.

Athetosis, with constant involuntary motion and loss of normal involuntary motion.

Ataxia, with loss of balance and sense of position.

Circulatory disturbances.

Loss of sensation.

Loss of a part.

EXERCISE CONSIDERATIONS IN THE USE OF ACTIVITIES

Activities used as exercise must be selected and adapted to meet the patient's exact need in restoring muscular power, range of motion or coordination. The plan of treatment must be flexible enough that activity can be increased or decreased as the patient's condition indicates.

Carpentry, metalwork, toolwork and innumerable other activities offer a wide range of possibilities in localizing action in groups of muscles, grading muscular power and increasing the range of articular motion. Work processes not only aid in functional restoration but provide an incentive to exercise and an adjustment to normal work.

Exercise in occupational therapy functions to increase power, to develop control, to establish and maintain good posture, to promote nutrition—of a part or of the body in general—and to train in substitution—in the absence of a part or in case of permanent paralysis.

PRINCIPLES OF TREATMENT

Exercise is directly planned to meet the physical need of the patient, and the activity used as exercise depends on the existing condition or combination of conditions. The following principles guide the therapist:

Articular Limitations with Muscular Weakness.—Muscular Weakness: Graded resistive exercise is used to improve muscular tone. Resistance is controlled through the weight of equipment, materials and resistance in pulling. Increase of muscular power is necessary if the range of articular mobility is to be increased.

Articular Limitation: Forced motion is graded in the range of mobility and the amount of force. Improvement of muscular power is essential to increase articular motion.

Loss of Power Due to Injury of a Nerve.—The possibility of using occupational therapy as well as the method of using it depends on the following factors: the amount of power in the groups of muscles, the balance of power around the joint and the possibility of localizing muscular function.

Treatment is directed toward establishing a balance of power and increasing the grade of power through the resistance offered by materials and equipment.

The action of the group of muscles being strengthened should be in the direction of contraction.

The position of exercise is determined according to the grade of power.

With poor muscular power, contraction is possible if gravity is eliminated. A sling suspension may support the arm, thereby allowing full activity (see fig. 1).

With fair muscular power, the patient can use the part against gravity or its equivalent in resistance.

With good muscular power, the patient can use the part against outside resistance as well as gravity. The resistance of the materials and equipment is gradually increased as muscle power is regained.

When muscles of two joints are involved, position of the adjacent joint should contribute to the mechanical advantage of the muscle being strengthened. For example, the wrist should be in extension in using the finger flexors, in flexion in using the finger extensors.

Loss of Muscular Control Due to a Lesion of the Central Nervous System.

Spasticity: Relaxation of the spastic muscles should be obtained, then the weak antagonists should be strengthened. A stretch reflex should be avoided.

Athetosis: A consciousness and control of relaxation must be developed to replace the involuntary relaxation which is lost. Relaxation



Fig. 1.—The use of a sling suspension to relieve gravity. Square knotting serves as the exercise with the arm supported.

should become habitual. If tension has developed in a patient because of a compensating effort to control athetoid movements, this tension must be reduced through conscious effort.

Athetoid Movements: These must be reduced through the successful performance of gross movements and gradual development of finer move-

ments—self consciousness increases athetoid movements. Therefore, activities which are absorbing and center attention objectively are preferable. Build on success, and minimize failure.

Ataxia: Balance and coordination must be developed through cortical or voluntary control. The reestablishment of a muscle sense is achieved through eye to hand training.

ADAPTATION OF ACTIVITIES IN EXERCISE

Grading on Basis of Muscular Power.—Assistive Motion: This may be based on (a) assistance of the operator or (b) assistance of the apparatus (bicycle, saw, treadle, loom).

Active Motion (Gravity Eliminated).

Resistive Motion: This may be based on (a) resistance of gravity, (b) resistance against a contracture or (c) graded outside resistance (tools, apparatus or materials).

Grading in Duration and Frequency of Work Periods.—Forced motion (forced stretching of a contracture) may be achieved in one of three ways: (a) forcing by muscular effort only (patient's own effort to stretch), (b) forcing by muscular effort plus outside force (use of tools or apparatus) and (c) passive stretching (relaxation of muscles and exertion of force by the patient's own body weight or by muscular effort from above the joint).

Control of Activity to Meet Definite Needs.—Alternate Contraction and Relaxation: In any activity alternate contraction and relaxation of muscles is better than maintained contraction, which is fatiguing.

Repetition: The desired motion should be capable of repetition for a controllable number of times.

Grading of Muscular Power and Range of Motion.

Localization of Action: The activity should permit action to be localized in the joint or group of muscles in order to obtain the desired results. The proximal or the distal joint or both should be stabilized when necessary.

Muscles Involving Two Joints: The position of the adjacent joint is important in order to obtain mechanical advantage for the muscle being strengthened.

Coordination of Muscular Action: This is achieved through breaking up the activity into single motions, progressing to combined motions. Grade the position of the patient while performing the activity from that of complete relaxation to that requiring balance control.

Adaptation of Activities to Meet Individual Needs.—Activities must be adapted to meet the exact exercise need yet must not be so distorted that the patient's interest is lost.

Position of Patient: The patient may lie flat, sit upright or stand.

Position of Work: The work may be high, low, flat, upright or placed at an angle. The position of the patient and his work controls the arc of motion in exercise.

Special Equipment: Support or localization may be obtained with special equipment, for example, a sling suspension (see fig. 1).

Adaptation of Equipment: Adjustments may be made in the equipment to bring into play the desired muscular or articular activity when it cannot otherwise be obtained.

Choice of Tools: Tools may be selected for size, weight or adjustability, such as tools with enlarged handles which may be decreased in size as function improves (see fig. 3).

Choice of Materials: Materials may be selected for size, weight or hardness.

Choice of Project: Size and shape of equipment, processes in construction and complexity may govern the choice of a project.

Method of Work: This depends on desired function.

Duration and Frequency of Work Periods: The plan depends on the patient's tolerance.

Cautions in Using Activities as Treatment.—The following factors should be considered: pain which persists longer than an hour after activity, swelling and local heat in a joint, stretching of paralyzed muscles, fatigue which persists, compensation of strong muscles for paralyzed ones and attempting processes beyond the patient's physical or intellectual capacity.

Progress Records.—Accurate and adequate records are essential for assuring the most effective treatment, for exchanging information between departments, for encouragement and incentive for the patient, for a cumulative knowledge of methods and results and for protection in recording treatments given.

These records should include the following data:

Description of the treatment, the exercise specifically directed to the injured part and the grade of activity for general fitness.

Results noted in terms of increase in articular mobility, muscular power, useful function and general physical endurance.

Psychologic factors, such as cooperation, attitude, social adjustment, intelligence and symptoms pointing toward psychic disturbance.

Skills and aptitudes which will point toward future training or placement.

FRACTURES

Purpose of Occupational Therapy.—In cases of fracture occupational therapy serves to maintain motion and strength in uninjured parts, to aid circulation and nutrition to the injured part, and to restore normal motion and strength when active exercise is indicated. (See the section

on "Articular Limitation with Muscular Weakness" under the heading Principles of Treatment.)

Böhler³ wrote: "In any fracture, stiffness of the parts not injured is always the result of treatment, not injury—that is, neglect of motion from the first."

Kennedy⁴ stated:

There is a simple physical agent—active exercise—that is often neglected in fracture treatment. Active exercise should be prescribed from the moment the fracture has been reduced, the method of fixation decided on and fixation effected. A fracture patient enters the hospital a broken man, not a sick man physically or mentally. The less he is put in the category of the sick patient and the more he is treated as a person who was well an instant before the accident and expects to remain well, the shorter will be the period in which he needs convalescent care.

. . . Because one leg is injured there is no excuse for allowing the muscles of the neck, back, and three other extremities to deteriorate and greatly prolong the convalescence. Suppose on getting out of bed you will need to use crutches. Might you not prefer to have two strong arms and one strong leg to support you? . . .

The fracture patient needs work therapy—not a vacation but a hardening process. Ways and means should be devised to keep his mind and body occupied from the start. He should not be treated as a star boarder but as a perfectly well man except for one cracked-up part. If it is brought to the nurses' attention and properly supervised, the patient can help with many things in ward work without disturbing the morale.

Occupational therapy needs to be introduced much more widely in general hospitals. There are several excellent schools training persons to teach this. The great difficulty is to keep it from developing into a routine rather than using imagination to make the best adaptation for the individual patient. Physicians in general cannot know how to do this, but they should recognize its value, know when it is well done and back it enthusiastically. Occupational therapy is many times more valuable than the usual types of physical therapy for these patients. Even without a trained instructor and a shop, much can be done in a simple way if some one is interested in doing it.

As an occupant of a general hospital the fracture patient is too often conditioned to become an invalid during his stay. Frequently he requires prolonged care to recover from his hospitalization rather than from his injury. . . .

It would mean that a well man coming to a general hospital with a fracture would not be treated as if he were ill but as a convalescent from the start. He would be taught how to use all joints and muscles in the region of immobilization, commencing on the first day. He would be started immediately on general exercise to preserve the musculature which he brought with him. He would be given a job to do while in bed which would occupy body and mind and make him feel he was still a part of a moving world. As soon as he was out of bed he would be taught some form of occupational therapy, if possible similar to the work he did before he was hurt.

3. Böhler, L.: *The Treatment of Fractures*, ed. 4, translated from the fourth German edition by E. W. H. Groves, Baltimore, William Wood & Company, 1935.

4. Kennedy, R. H.: *Active Exercise in Fracture Treatment*, Arch. Phys. Therapy 2:720 (Dec.) 1941.

Opinion varies as regards the injury itself. There are those who advocate gentle activity when fibrous union has taken place. Others maintain immobilization until there is bony union. Occupational therapy meets the needs of the exercise program from the lightest active motion, with no attempt to go beyond the existing range and with no resistance to the weak muscles, for the beginning treatment to forced stretching for an old stiff fracture, with strongly resisted motion to increased muscular strength. Hurt⁵ brought out the point that forced stretching in occupational therapy by the patient's own effort is probably safer and more successful than that which is applied by another person. (See the section on "Articular Limitation with Muscular Weakness" under the heading Principles of Treatment.)

Dickson⁶ stated:

Occupational therapy is a very useful way of overcoming the subconscious resistance of the patient to normal use of an injured part for fear he will suffer a relapse. It is often a useful bridge over the hiatus between return of use and return to normal life and activity.

Occupational Therapy with Reference to Fractures of Specific Regions.—Fractures of the Upper Extremity: Wilson⁷ stated in part:

All function of the upper extremity centers about and is subservient to that of the hand. The hand is the tool, and the forearm and upper arm, together with the various articulations, are merely the levers and gears that adapt the tool to its tasks and apply the power, and provide the means of movement. The usefulness of the upper extremity depends upon maintaining the delicate and multiple activities of the fingers and thumb. If these are lost, the result is almost as unfortunate as if the extremity were amputated.

The treatment of fractures of the upper extremity must therefore be directed with the constant consideration of the necessity of preserving the mobility of the articulations and the suppleness of the muscles.

Occupational therapy is particularly applicable in developing and maintaining functional usefulness of the hand.

Fractures of the Shoulder Region: A common disability in fractures of the shoulder region is weakness of the deltoid muscle. When occupational therapy is indicated, the arm should be removed from the splint with great care to prevent stretching of this muscle. Exercise may be given with the arm held at shoulder level in an overhead sling suspension apparatus (see fig. 1).

When the strength of the deltoid muscle is equal to exercise without the sling suspension, a carefully graded program is started. At first,

5. Hurt, S.: Occupational Therapy in Functional Work, *Occup. Therapy* **19**:163 (June) 1940.

6. Dickson, F. D.: Physical Therapy in the Treatment of Fractures, *J.A.M.A.* **111**:1016 (Sept. 10) 1938.

7. Wilson, P. D.: Treatment of Fractures in Specific Regions, in Mock, H. E.; Pemberton, R., and Coulter, J. S.: *Principles and Practice of Physical Therapy* Hagerstown, Md., W. F. Prior Company, Inc., 1934, vol. 2, chap. 5, p. 47.

the weight of the arm will give enough resistance and only light activity is indicated. Later, strength is increased through the resistance offered by the equipment and material used.

External rotation of the shoulder is essential for normal range of shoulder motion. This may be obtained through the use of the screw driver and special screws with threads running in a direction opposite to normal. The position of mechanical advantage for the outward rotators is with the arm held at a forty-five degree angle to the body (see fig. 2).



Fig. 2.—The use of regular screws and special ones with threads running in the opposite direction. In the position shown supination of the forearm is obtained. The same work with the arm held at a 45 degree angle from the body gives outward rotation of the shoulder.

Carpentry with the use of various tools is adaptable for exercise of the shoulder (see fig. 3), as well as for exercise of the hand, forearm and elbow.

Fractures of the Elbow: Fractures in or near the elbow joint frequently result in limitation of motion of the elbow, supination of the forearm and loss of function in the wrist and hand.

The miter saw may be used as exercise for elbow extensors (see fig. 4).

Care must be taken to prevent the patient from compensating and getting motion in the shoulder instead of the elbow. When treating the forearm pronators and supinators, it is advisable to have the upper arm held to the side of the body in order to prevent rotation in the upper arm instead of localizing the action in the forearm. The aforementioned special screws (fig. 2) are used for this exercise.



Fig. 3.—Carpentry, with the work at or above the shoulder level, is used for exercise for the back and shoulder. Tools requiring bilateral action prevent compensation.

There are many useful occupations for increasing strength and motion in the elbow and the forearm. For the extensors planing, sawing, filing, sandpapering, knotting and loom weaving of various kinds are some of the possibilities. Many of these occupations may also be adapted for treatment of flexors.

Knotting (fig. 1) is also exceedingly good for supination of the forearm and may be adapted for pronation. It is a bilateral exercise preventing a muscular compensation.

Fractures of the Wrist (Colles' Fracture): Soon after the cast is applied, motion in all unaffected joints may begin. With the wrist completely immobilized in a cast, activity requiring full flexion and extension of the fingers should be given. Stiffness in the elbow and the shoulder should also be prevented through activity in full range of motion. The patient is usually fearful of exercise, and therefore interesting activities which distract his attention are preferable to monotonous subjective exercise.



Fig. 4.—Sawing increases the muscular power of the flexors of the upper arm and the extensors of the elbow.

After removal of the cast exercise should be planned to increase extension of the wrist and flexion of the fingers. One method of accomplishing this is to use tools with large handles in sanding wood, filing, etc., as shown in figure 5.

Fractures of the Lower Extremity: Wilson ⁷ stated in part:

The functions of the lower extremity are of a highly specialized type and have to do chiefly with weight bearing and locomotion.

The ordinary individual can therefore tolerate a certain degree of limitation of the movements of the hip, knee or ankle with little functional loss; in dealing with fractures of the lower extremity, preservation of skeletal alignment is more

important than restoration of complete mobility. This does not mean to imply that one should not aim for full restoration of movement, but that early mobilization of the articulations should never be prescribed if it involves the slightest risk of disturbing the alignment.

Also, greater emphasis is to be placed upon active exercises performed regularly by the patient than upon massage or passive mobilization.

The first exercise for fractures of the lower extremity should be non-weight-bearing. An apparatus providing such exercise for hip,



Fig. 5.—The handles of tools and sandpaper blocks are built up to fit the hand and are reduced in size as the flexion of the fingers increases.

knee and ankle and maintaining alinement is the bicycle jigsaw. Special pedal attachments make it possible to convert this exercise from one using the extensors only to a pulling action using the flexors. Pedal and seat shafts of extra length increase the flexibility of this apparatus and allow full flexion of the knee (see fig. 6).

Fractures of the Spine: Neurosis is the great hazard among patients who have had spinal fractures. Early occupational therapy for diversion

is essential to prevent neurotic patterns from developing. Later exercise through normal occupations and recreations aids not only in functional but in psychologic rehabilitation.

At first the spine is immobilized by a correctly applied extension plaster jacket, so that the lumbar portion of the spine cannot be flexed.⁶ During this period normalizing activity should be planned for the patient, in order to prevent neurotic patterns from developing.



Fig. 6.—The bicycle jigsaw is used to increase the strength of the flexors or extensors of the hip and knee. With special pedals and adjustable long and short shafts for the pedals and the seat the patient may pull the pedals around to increase flexion or push them for extension.

When the jacket is removed, exercises to restore function may be used. Occupations center attention objectively and aid in vocational rehabilitation.

Special information is necessary on referring cases of fracture (see the section on "Occupational Therapy and the Physician" for the

general information necessary), such as the length of time and the position of immobilization, the type of union present, whether the part if still in a cast may be removed for exercise, the date of removal if a cast has been removed, whether the part if in a sling may be removed for exercise, whether weight bearing is permitted if a leg is encased and whether there is any complicating injury of a nerve. (See the section entitled "Injury of Peripheral Nerves" for information regarding a lesion of a nerve accompanying a fracture.)

DISLOCATIONS

Purpose of Occupational Therapy.—In cases of dislocation occupational therapy serves to maintain motion and strength in uninjured parts, to promote circulation and nutrition of the injured part, to strengthen musculature around the joint which has been dislocated, to restore motion if stiffness has developed and to overcome the fear of recurrence of the dislocation.

In the opinion of Böhler³ the treatment for dislocation after the necessary period of immobilization is "active exercise against resistance."

One of the most frequent dislocations is that of the shoulder. In considering dislocations of this type Watson-Jones⁸ stated:

All bandages and slings are discarded in three weeks and elbow and shoulder movements are regained by active exercise. There must be no passive stretching; this is the cause of permanent stiffness of the shoulder and of myositis ossificans. There is no danger of permanent stiffness from three weeks of immobilization of the injured shoulder if full movement is retained in the distal joints and passive stretching and manipulation under anaesthesia are avoided. Recovery is quite complete within a period of from five to eight weeks.

Suggested Occupations.—Several occupations suitable for treatment in the order of their use are shown in figures 1, 2 and 3.

Special Information Necessary on Referring Cases of Dislocation.—Certain special information (see the section on "Occupational Therapy and the Physician" for general information) should be included in the prescription, such as direction of dislocation, probability of recurrence and precautions regarding casts and slings, as discussed for fractures.

STRAINS AND SPRAINS

In general, the material presented under the heading Dislocations is applicable to strains and sprains.

The injured part is immobilized, and activity is prescribed for uninjured parts. Later graded activity is prescribed for the injured joint.

8. Watson-Jones, R.: *Fractures and Other Bone and Joint Injuries*, Baltimore, Williams & Wilkins Company, 1941.

CONTRACTURES DUE TO BURNS

Purpose of Occupational Therapy.—In cases of burn occupational therapy serves to prevent contractures and to stretch those which have already occurred.

Purpose of Physical Therapy.—Physical therapy is directed toward softening tissue before active stretching by occupational therapy.

Special Information Necessary on Referring Cases of Contracture Due to Burns.—Certain special information (see the section on "Occupational Therapy and the Physician" for general information) should be included in the prescription, such as date of grafts, when and how much stretching is safe and danger of irritation from tools or materials.

Treatment should be carefully graded under a physician's direction from active motion within the existing limits through active effort to stretching and forced stretching. (See the section on "Articular Limitation with Muscular Weakness" under the heading Principles of Treatment.)

In treatment which is of necessity as long drawn out as that of contractures due to burns, occupational therapy is particularly essential.

LACERATIONS OF TENDONS

Purpose of Occupational Therapy.—In cases of lacerated tendons occupational therapy serves to encourage muscular response in the direction of the sutured tendon, to give graded stretching of the shortened tendon with motion in the opposite direction and to work for motion and strength in both directions.

General Considerations.—Mason and Allen,⁹ in discussing the rate of healing of tendons, stated:

(1) Tendon healing as measured by its tensile strength exhibits three phases:

A. Phase of rapid diminution, which lasts about five days.

B. Phase of increase in tensile strength up to a plateau, which it reaches about the sixteenth day.

C. Second phase of increase in tensile strength, which probably starts between the nineteenth and twenty-first day and continues for an undetermined period of time.

(2) Curves of tensile strength conform to phases observed in histologic process of repair:

A. Phase of exudation and fibrinous union.

B. Phase of fibroplasia.

C. Phase of maturation or organizing differentiation.

9. Mason, M. L., and Allen, H. S.: Rate of Healing of Tendons, *Ann. Surg.* **113**:424 (March) 1941.

(3) Function to which the healing tendon is subjected is directly reflected in the curve of the third phase of healing. During the first and second phases it produces no effect unless it is so great as to cause marked separation. During the third phase of healing function accelerates the curve.

(4) *Function and motion during the first two phases of healing lead to increased reaction and to separation at the suture line* [the italics are ours]. Restricted use of the tendon, started on about the fourteenth day and continued for one week, or preferably two, may be expected to lead to only a slight increase in reaction and to a rapid increase in tensile strength of the union. Active unguarded use even after three weeks of immobilization may be associated with stretching of the suture line and always leads to increase in reaction.

Among the most frequently lacerated tendons are those of the wrist. Figure 5 demonstrates the position of mechanical advantage in regaining function following laceration of the extensor tendons at the wrist.

INFECTIONS OF SOFT TISSUES

In cases of infection complete immobilization should be observed to prevent spread. Even movements of unaffected joints in the same part should not be allowed until all danger of spread is over. Thus, physical therapy would be indicated before occupational therapy.

Purpose of Occupational Therapy.—This depends on the resulting conditions, which in turn depend on the severity and duration of the infection.

In all cases activity is given to increase circulation and nutrition.

Muscular atrophy must be treated by graded resistive exercise for strength.

Scar tissue or contractures from immobilization must be treated by exercise to stretch.

(See the section on "Articular Limitation with Muscular Weakness" under the heading Principles of Treatment.)

INFECTIONS OF BONES

Immobilization looms large in the treatment of infection of bones, with the attendant implications of the needs for occupational therapy under these conditions, which have already been set forth. (See section on "General Considerations" under the heading Orthopedic and Surgical Conditions.) These needs include graded occupational therapy to achieve general physical fitness and mental fitness and later to increase circulation and nutrition in the affected part and to return to normal function. Also occupational therapy in this connection may be regarded as control of activity.

During the stage of active infection, when fatigue is an important factor, occupational therapy may promote rest and prevent restlessness. During convalescence occupational therapy provides controlled exercise of the affected part.

Special information is necessary on referring cases of infection of a bone (see section "Occupational Therapy and the Physician" for general information), with special warning against fatigue and indication of the probable point of fatigue.

HEAD INJURIES

The paralysis which results from trauma of the cerebrum may be flaccid, with an absence of all deep tendon reflexes. Eventually an increase of tone develops in the muscles of the affected extremities. The commonest forms of trauma to the cerebrum are gunshot wounds and depressed or comminuted fractures of the skull.

In cases of head injury there is usually a period of absolute rest required, with the patient under sedation if necessary. Later, when rest is still essential but when the acute state is past, occupational therapy may be used as a control of activity, and as a means of promoting rest and of preventing restlessness.

As the patient begins to recover, voluntary power will return in the muscles of the hemiplegic extremity. At this time occupational therapy should be started. The patient's help must be sought. He should be told that the ultimate degree of recovery of function depends to a great extent on his enthusiastic and persistent cooperation. The patient should be closely directed in his occupational therapy from the beginning.

If the head injury has produced actual damage to the brain, the effect on muscular function will depend on the area damaged. (See the paragraph on loss of muscular control under the heading Symptoms Treated Through Occupational Therapy.)

POST-TRAUMATIC HEADACHES

Cairns¹⁰ stated in part that there is no certain way of preventing post-traumatic headaches but that one can condition a patient to them by graded physical activity, combined with explanation and analgesic drugs when required. It is better policy to get the patient out of bed about a week after he has recovered full consciousness and then, without curtailing the time spent in the hospital, subject him to a graduated regimen of physical hardening. This can be done without increasing the frequency of post-traumatic headaches.

Cairns emphasized the fact that after the patient has returned to consciousness, the process of getting up should not be long delayed, and occupational therapy may be necessary, especially for patients in the armed services, who must be rendered fit for full duty before they can be returned to their units.

10. Cairns, H.: Rehabilitation After Head Injuries, *Brit. J. Phys. Med.* **5**:84 (May-June) 1942.

INJURIES OF THE SPINAL CORD

Davis,¹¹ in considering the after-care of injuries of the spinal cord, stated that often the condition of the paraplegic patient is looked on by physicians as hopeless. Many times physical and occupational therapy is carried out effectively until the patient is ambulatory, and then his further treatment is neglected. It is necessary to teach each patient to use his recovering muscles to the best advantage.

In case of injury of the spinal cord the resulting paralysis should be treated according to the instructions given for injury of peripheral nerves. (See also the section on "Loss of Power Due to Injury of a Nerve" under the heading "Principles of Treatment.")

It is essential to institute occupational therapy in such a case from the first for the patient's mental health. In case of a spinal injury fear may produce serious psychic complications.

Specific information as to mental and physical factors is necessary on referring cases of injury of the spinal cord.

INJURY OF PERIPHERAL NERVES

Injury of peripheral nerves may require (1) an operative procedure, (2) protection and (3) physical and occupational therapy for preservation and reeducation of specific muscles. (See "Loss of Power" under "Principles of Treatment.")

Occupational therapy for the affected part is not indicated until a rating of at least "poor" has been attained for all muscles and not then unless it can be specifically applied to obtain the desired exercise. (See the section on "Loss of Power Due to Injury of a Nerve" under the heading "Principles of Treatment," also the section on "Adaptation of Activities to Meet Individual Needs" under the heading "Adaptation of Activities in Exercise.")

Davis¹¹ stated, in part, regarding postoperative treatment:

It is unfortunate that many times nerve ends are sutured and no thought is given to what we consider to be at least of as great importance, carefully supervised and persistent physical therapeutic after-care. If the paralyzed muscles are allowed to shorten and contract or the joints become ankylosed or fibrosed, it is of little value to have sutured a nerve and have its fibers regenerate. Every effort must be directed toward restoration of the normal physiological function of the paralyzed muscles.

There is a definite increase of connective tissue in a muscle as early as three weeks after section of its nerve. Part of the late contractures are due to shrinkage of this newly formed, soft and extensible tissue. Active or passive movements of the muscle will stretch the developing connective tissue fibers so that when they shrink there may be less tendency to a contracture.

11. Davis, L.: Principles of Neurological Surgery, Philadelphia, Lea & Febiger, 1942.

Physical therapy should be carried out by individuals who fully realize the ease with which atrophied, denervated muscles may be injured by rough methods and fatigue. In a great many cases better results are obtained by simple devices and games which effect an unconscious and effortless exercise of the contracted muscles or ankylosed joints. We have found that most individuals require a definite goal to accomplish in each type of active exercise instituted to maintain their enthusiasm during the long period of physical treatment which is necessary.

Regeneration of a nerve is a slow process, and exercise will pall on even those most anxious for recovery. If it can be adapted to constructive activities, the interest stimulus will relieve the tedium. Occupational therapy minimizes the possibility of a subconscious mental factor as an inhibitor of return of function. Occupational therapy for unaffected parts is strongly indicated from both the mental and the physical standpoint throughout the entire period of treatment. (See the section on "General Considerations" under the heading Orthopedic and Surgical Conditions.)

Special information is necessary on referring a case of injury of a peripheral nerve (see the section on "Occupational Therapy and the Physician" for general information).

Areas of sensory or trophic disturbance should be noted and precautions taken regarding possible irritation or injury from tools or materials.

AMPUTATIONS

Purpose of Occupational Therapy.—In case of amputation occupational therapy serves to minimize the shock produced by the trauma, thus preventing psychic complications; to help in mental and physical adjustment to the disability; to strengthen the muscles of the stump or the remaining adjacent parts, and to prepare the patient for vocational rehabilitation.

The "Handbook on Amputations"¹² stated:

Occupational therapy is more interesting to the patient than formal gymnasium exercise and through games and work provides exercise for increasing the muscle strength in the stump. Such therapy is of great psychologic value because in the curative workshop the patient finds that he can work or play in spite of his disability, and he also finds social contact with other handicapped persons. He becomes interested in what he is making rather than merely in exercises in which his attention is centered on himself. The occupational therapy technician must be given careful instruction as to which muscles of the stump require developing. Even with little equipment, the therapist can devise games that will not only amuse the amputee but also provide definitely useful exercise.

Occupational Therapy for Arm Amputation Patients.—An inventive occupational therapist can eliminate the necessity of waiting for provisional apparatus by making tools and devising methods for holding them even before temporary

12. Handbook on Amputations, Prepared by the Council on Physical Therapy, Chicago, American Medical Association Press, 1942, p. 54.

appliances can be secured for arm stumps. When the amputation has been through the forearm, the stump may be fitted with a leather cuff with a ping pong racket attached. Ping pong games played between patients fitted with similar appliances provide exercise which cannot be obtained by formal exercise and also result in a vastly improved mental state for the patients.

Occupational Therapy for Leg Amputation Patients.—Many interesting games to be played before a leg stump is fitted with temporary appliances may also be devised by the occupational therapist. "One leg golf" is such a game and will help develop balance and confidence; it is particularly adaptable to large hospitals where there are a number of leg amputees in one ward. In playing the game the floor is marked into squares; the object is to kick around a wooden disk, 6 inches [15 cm.] in diameter and 1 inch [2.5 cm.] thick, from one marked square to another according to numbers. Sides may be chosen according to the amount of support a player must use. For example, if a man using crutches is on one side, the other side could have two men without crutches. The player should be taught to fall so he won't injure his leg, on his shoulder for example.

Exercises and games may also be used to teach balancing and turning without crutches when the patient is using an artificial leg. For instance, this game devised from an exercise: The player walks on a plank 12 inches [30 cm.] wide, 2 inches [5 cm.] thick and 12 feet [360 cm.] long that is raised 6 inches from the floor. Points are deducted if the player loses balance so that he must grasp a rail placed near the plank. The patients may also be taught to play ping pong and golf.

It is impossible in this short chapter more than to outline the exercise and occupational therapy program. An extensive and varied program can be devised by the physical and occupational therapy technicians who work together in planning the patient's program.

Special Information Necessary on Referring Cases of Amputation.—Certain special information (see the section on "Occupational Therapy and the Physician" for general information) includes whether the stump has healed, whether there is danger of reopening it, whether there is danger of irritation or infection and which muscles should be developed.

HYSTERICAL PARALYSIS

Hysterical paralysis may simulate a variety of conditions. It may be entirely of psychoneurotic origin, or it may be combined with some primary physical condition. But regardless of the fundamental cause, if it continues for any length of time, secondary changes in body tissues occur, combining circulatory changes with contractures.

Shands¹³ stated:

The diagnosis of psychoneurosis should never be made until every effort to establish the presence of an organic lesion has been exhausted. The treatment of functional paralysis and deformity should be largely psychiatric. It is of fundamental importance that the confidence and active interest of the patient be secured. After this has been done . . . emphasis should be placed upon active motion and active correction. Occupational therapy will often prove of value.

13. Shands, A. R., Jr.: *Handbook of Orthopedic Surgery*, St. Louis, C. V. Mosby Company, 1940.

Occupational therapy would seem to be the most valuable factor at hand both in diagnosis and in treatment, since it strikes at the cause—psychoneurosis—and at the result—change in body structure.

ARTHRITIS

It is generally conceded that rest is necessary in the acute stage of arthritis—rest of the body as a whole, rest of the inflamed joints and mental rest. Physical rest depends on good circulation and maximum comfort of body and mind. Therefore, adequate means of producing complete rest must be instituted.

In the subacute stage of the disease articular function and muscular power must be regained. The patient's program should be so planned that there is a balance of complete rest with periods of prescribed activity. The period of convalescence is long and discouraging. Therefore, the plan of treatment must be such that it provides interests and emotional outlets and retains the patient's confidence and cooperation.

Among the measures of proved value recommended by the committee of the American Rheumatism Association¹⁴ are rest—general and local, prevention and correction of deformities, physical therapy, occupational therapy and psychotherapy.

The committee brought out the point that

. . . in prescribing rest, intelligence and insight are necessary. Many patients say that all they do is rest. Examination of such patients, however, will frequently show that they are tense and their muscles are in more or less constant spasm. Many of them get only fitful hours of sleep: they are completely exhausted, physically and mentally.

PURPOSE OF OCCUPATIONAL THERAPY

In cases of arthritis occupational therapy serves the following ends:

(1) Contributes to the program of rest during the period of acute articular involvement. Restlessness, anxiety and tension are reduced when the attention of the patient is centered objectively in constructive channels.

(2) Contributes to the program of exercise during the subacute period. A carefully graded program of exercise preserves function or aids in the restoration of muscular power and articular mobility.

(3) Adjusts the patient to a long time program of treatment preventing neurosis and unnecessary helplessness, furnishes a normal and satisfying means of self expression and aids in adjusting him to independence if he is physically able to return to work.

14. Primer on Arthritis, Prepared by the Committee of the American Rheumatism Association, J. A. M. A. **119**:1089 (Aug. 1) 1942.

Kovacs¹⁵ stated:

Extra rest for body and joints in positions favorable for general body mechanics is generally required; 10-20 hours of rather complete rest daily is recommended, but should not be overdone. Ambulatory patients with mild or moderate arthritis should be encouraged to work at non-traumatizing activity. Exercises should not be casual, but specified for the joints affected. Non-weight bearing, non-traumatizing exercises are preferred.

TYPICAL DEFORMITIES IN CHRONIC ARTHRITIS

Left to his own devices the arthritic patient is more comfortable when inactive, because he fears using painful joints. He usually assumes a poor posture with head forward, chest flat and the head of the humerus rotated inward and has little or no use of the intercostal muscles in breathing. The oxygen intake is cut down; circulation is retarded, and articular symptoms are therefore aggravated. In cases of arthritis good general circulation is of paramount importance to alleviate local symptoms.

The articular position of comfort is *flexion*, and flexion deformities are frequent in the fingers, wrists, elbows, shoulders, hips and knees. Placing a pillow under the thigh with no support under the head of the tibia frequently leads to subluxation of the knee. Lack of proper support for the foot and pressure of bed clothes may result in rotation of the hips and drop foot.

During the acute period of the disease adequate support should be given to prevent the aforementioned disabling deformities.

If ankylosis is unavoidable, the affected joint should be fixed in the best position for functional use.

Joplin and Baer¹⁶ stated:

Rest, unquestionably, is the sheet anchor in orthopedic management of arthritic joints. *Comfortable support to the affected part* should be provided in a neutral position or in a position for optimum use should the joint eventually become limited in motion or ankylosed. *Active or guided motion* (without injury) must be employed daily in an effort to retain as much motion as possible: [Activity prevents] the formation of adhesions within the joint [and] contractures of periarticular structures [and also provides] a *stimulus* to the articular cartilages. [The italics are ours.]

15. Kovacs, R.: The 1942 Year Book of Physical Therapy, Chicago, The Year Book Publishers, Inc., 1942.

16. Joplin, R. J., and Baer, G. J.: Treatment of Arthritic Joints, J. A. M. A. **118**:937 (March 21) 1942.

OCCUPATIONAL THERAPY AS EXERCISE

Comroe¹⁷ stated:

Early orthopedic management is an important phase of therapy in arthritis. *The main aim of the orthopedic surgeon, in arthritis, is to preserve the function of joints or to restore such function if this has been impaired. He must constantly realize, however, that he is treating a patient and not merely several involved joints;* in rheumatoid arthritis, particularly, it is true that the whole is greater than any of its parts.

Because the arthritic patient is fearful of using painful joints, he needs a strong stimulus or incentive to exercise. Participation in carefully selected interesting activities provides this necessary incentive and stimulus. Attention is centered objectively, and he is more apt to relax and forget his fear of pain. The maximum of useful function is the goal in exercise. Activities providing not only the exact function desired but a coordinated use of the muscles and joints speed up return of function, as well as psychologic adjustment and socialization.

Traut¹⁸ stated:

Passive exercise being generally regarded as outlawed, *exercise by occupation* finds its natural place in the management of chronic and convalescent arthritis. Arthritis is a disease not only of joints but of the whole body. The mental attitude of the patient is of importance. For all these needs healing work is ideally suited. Instructions to physical therapists stress the unity of the whole joint mechanism: the joint, its capsule and the attacked ligaments, tendons and muscles. *Again exercise-work* cares for all these structures. [The italics are ours.]

OCCUPATIONAL THERAPY AS A MEANS OF CONTRIBUTING TO
PSYCHIC NEEDS

The importance of the psychic factors in arthritis should receive consideration. Rheumatoid arthritis is a constitutional disease of the entire person with local disturbances and frequently occurs in high-strung, conscientious and overactive persons. Toxemia may definitely affect the nervous system of a patient and cause emotional disturbances which, in turn, retard physical recovery.

An opportunity should be provided for wholesome emotional and spiritual outlets planned to meet the patient's individual needs. Occupational therapy can serve in a dual role by providing the desired physical exercise yet using interesting constructive activities which can give satisfying emotional outlets. This form of treatment is therefore one of the tools used by the physician in combating discouragement and the development of neurotic patterns.

17. Comroe, B. I.: Arthritis and Allied Conditions, ed. 2, Philadelphia, Lea & Febiger, 1941.

18. Traut, E. F.: What Every Occupational Therapist Should Know About Arthritis, *Occup. Therapy* 20:87-91 (April) 1941.

SUGGESTIONS IN THE APPLICATION OF TREATMENT

Wrists.—Deformity results from the overpowering pull of the flexor muscles. If dorsiflexion is impossible because of muscular atrophy, a cock-up plaster splint should be used. The angle of the wrist in dorsiflexion should be about 30 degrees. This splint should be strapped to the forearm above the wrist in order that it not prevent further dorsiflexion when muscular power returns. A patient doing craft work in this splint tends to pull away from it, thereby exercising the dorsiflexors. As soon as muscular power returns and dorsiflexion can be maintained, the splint is given up.

Hands.—Ulnar deviation and subluxation of the fingers are frequent deformities. Splints for them have been described by Joplin and Baer.¹⁶ The occupational therapist should use splints during the exercise period if they are needed in maintaining correct position of the fingers and thumb while exercising other joints. Ulnar deviation of the fingers should be guarded against. Working with the forearm supinated maintains a good corrective position.

Cramping and fine handiwork should be avoided if there are flexion deformities of the fingers. Activity requiring contraction of the muscles followed by relaxation is preferable to prolonged contraction, to avoid muscle fatigue.

Elbows.—The usual deformity is flexion, as this is the position of greatest comfort. The elbow is under strain when a patient pulls himself up and holds onto tables, chairs or canes; trauma thus results, and the articular condition is aggravated. Exercises or activities to maintain or improve extension of the elbow and supination of the forearm are indicated.

Shoulders.—There is usually a tendency to forward drooping, with internal rotation of the head of the humerus, and this combines with the flat chest and generally poor posture. Abduction and flexion of the upper arm are limited. The patient can compensate to some degree for an ankylosed shoulder by rotating the scapula and thereby obtaining motion of the upper arm.

Upper Extremities.—Any activity should be directed to improving posture; flexion, abduction and outward rotation of the shoulder; flexion and/or extension of the elbow; supination of the forearm; extension of the wrist, and function of the fingers. Among suggested activities is knotting—tying sailors' knots. This activity is as well suited as any craft to the many needs of the arthritic patient. It can be adapted to meet the necessary articular function and graded in muscular power, and it controls and improves posture and expansion of the chest (see figure 1 [use of a sling suspension is not indicated]). Carpentry and weaving, as well as many other crafts and games, may be adapted by the ingenious therapist.

Hips and Knees.—Flexion deformities are frequent. Conservative methods of improving extension of the hip and the knee are usually instituted prior to more drastic methods. Non-weight-bearing exercises are used. The therapist with ingenuity and an understanding of function can construct knee push and other apparatus to improve muscular power and function which the patient can operate while in bed. The bicycle jigsaw with extra length seat shaft and pedal, as illustrated in figure 6, provides an excellent non-weight-bearing exercise for extension of both hip and knee. With the feet strapped on the pedals they may be pulled in reverse action for flexion or pushed in the usual manner for extension. Caution should be used to prevent exercising the extensors of the hip in a position of outward rotation. Exercise may be given prior to surgical treatment to improve muscular power and after such treatment to keep function mechanically restored.

Ankles and Feet.—If there are deformities of the hips and the knees, there is a strain on the ankles and feet, producing pain and deformity. Pressure of bed clothes and lack of proper support for the feet cause a drop foot deformity. Regaining flexion of the ankles and toes is important, and non-weight-bearing exercise is indicated. Pedals with straps (fig. 6) make it possible to pull the pedals of the jigsaw in reverse, localizing action in the flexors. Wedges may be used to support the foot in a corrected position.

Marble games and picking up marbles with the toes may be used for exercising the feet.

SPECIAL REFERRAL INFORMATION

The referring physician should provide the therapist with the following information: (1) type of arthritis; (2) stage of the disease, whether acute, subacute or chronic; (3) general cautions to be observed; (4) type and amount of activity indicated for specified joints; (5) length and frequency of exercise period; (6) special cautions to be observed, such as (*a*) joints in which function is to be avoided and (*b*) other physical factors which may have a bearing on the type or amount of exercise and materials used, such as cardiac involvement or allergies, and (7) useful information regarding the patient's emotional adjustment and needs.

CAUTIONS AND CONSIDERATIONS

Exercise is not indicated during the acute period, while there is local heat in the joint and redness. The physician may allow exercise after the acute period in spite of existing swelling.

The therapist must be on the alert to observe any recurrence of local heat and redness in the affected joints. The patient's activity should cease at once, and the symptoms noted should be reported to the physician in charge.

The amount of activity which the patient can tolerate in a given length of time, frequency of exercise periods and the muscular power expended should be carefully considered. The program of treatment must be so flexible that it can change at a moment's notice, as the patient's condition indicates.

Work and rest should be balanced in a plan of exercise. Activity should be followed by complete relaxation.

Exercise should stop prior to the point of fatigue or pain. Pain persisting for over an hour after treatment or increased pain the following day indicates overexercise. Active exercise should not be given if there is muscular spasm.

Measures to correct subluxation of joints should be instituted prior to the effort to regain function. Functional alinement of the joints should always be maintained.

Muscular atrophy from disuse is more readily corrected than atrophy resulting from injury of a nerve.

Muscular power must be regained in order to force articular motion and to assist in counteracting adhesions.

Exercise of involved joints in cases of osteoarthritis may be indicated to prevent secondary fibrositis and atrophy from disuse. Activities causing articular distress of more than half to one hour's duration or causing increased stiffness should be decreased or discontinued. Spur formations may irritate soft tissue.

Exercise should be so planned that the most necessary functions are concentrated on, that the best alinement for articular function is maintained and that the patient and his work are in the best position for posture and function.

Frequent and careful measurements of the treated joints, taken by either the physical therapist or the occupational therapist, make it possible to record accurately the result of activity, whether it be gain or loss of motion. With this system loss of motion which may not be perceptible to the eye is detected. Gain encourages the patient and the worker and adds zest to the treatment.

Summary.—Steinbrocker¹⁹ brought out the value of purposeful, interesting activities as a motivation in exercise:

All exercise is given for the purpose of correcting deformity and improving the function of various parts of the body. Since progress is slow and the end to be obtained is often months in the future, the patient becomes restless, bored, and discouraged. To combat this and to continue with motion in the disabled joints, crafts and various manual skills can be utilized.

19. Steinbrocker, O.: *Arthritis in Modern Practices*, Philadelphia, W. B. Saunders Company, 1941.

There is no one activity that will suffice. There are innumerable occupations that can be adapted by an ingenious therapist to meet the functional needs of the patient, provide constructive interests, combat discouragement and prevent neurotic patterns from developing.

The therapist dealing in this field should have ingenuity in devising special corrective equipment and should have adequate understanding of muscular and articular function. She should also be sensitive to the emotional needs of her patient and have unlimited patience in helping him adjust to the long period of pain and frustration.

The end result of good treatment is a person fitted to take his place in the active world again. Skills should be discovered and fostered during the period of treatment, and the patient should be prepared for vocational training or placement if he is physically able to compete with normal persons.

CORRECT POSITIONS FOR GENERAL RESTING, LYING IN A BED AND SITTING IN A CHAIR

Rest is fundamental in the treatment of arthritis and should precede and follow exercise.

Positions for Attaining Physiologic Rest.—This type of rest may be induced by the following positions:

Supine Position: This position is to be assumed one half hour after meals. The patient lies on a flat, firm mattress or on the floor if the mattress sags. The pillow under the head is eliminated, the arms are placed at right angles from the body, with hands resting on the mattress in a medial position, and the chin is drawn in. A thin pillow or roll under the scapulas forces the chest high, and a thin pillow or roll under the head of the tibia creates slight flexion of the knees and prevents strain on the lower portion of the back. A support is necessary at the feet to prevent foot drop. Sandbags may be necessary to prevent rotation of the hips.

This position should be approximated as nearly as possible. The patient who has been long bed ridden and has had several pillows under the head, producing flexion of the cervical portion of the spine and a flat chest, must be gradually adjusted to this hyperextended position, first by the gradual removal of the pillows under the head and eventually by adding the roll under the scapulas. If the articular limitation prevents the prescribed position of the arms, approximate the position as nearly as possible, making an effort to obtain outward rotation of the head of the humerus to force expansion of the chest.

Prone Position: This position relieves the bedridden patient and may be adopted during a half hour of the rest period. A pillow is placed under the chest, and the arms are placed at right angles to the

body, with the elbows flexed and resting on the mattress. A pillow under the lower leg assists in maintaining slight flexion of the knee and prevents a drop foot position. Sandbags may be necessary to prevent rotation of the hips.

Positions in Bed.—Recumbent Position: This position serves to prevent deformity and to improve general circulation. The following instructions should be observed:

Make the mattress flat. Boards as a rule should be put under the mattress.

Preferably eliminate a pillow under the head. A flat chest and slowing up of the circulation result if a pillow is used.

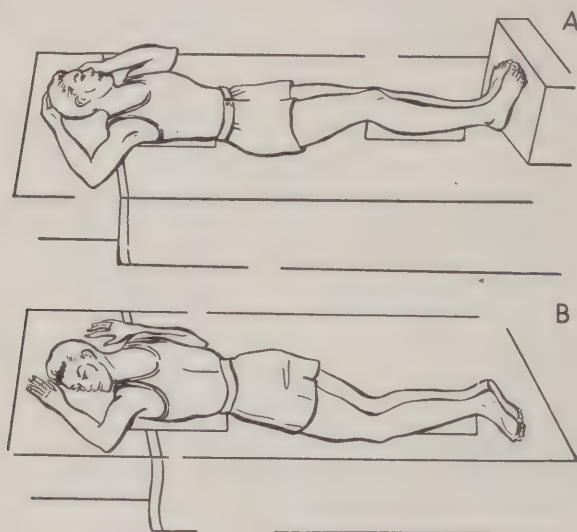


Fig. 7.—Positions assumed in bed by the arthritic patient to obtain physiologic rest. *A*, the supine position. *B*, the prone position.

Place a small pillow or roll under the head of the tibia. Subluxation of the knee frequently results from a pillow under the thigh.

Train the patient to lie with his elbows and wrists extended to prevent flexion deformities. The arthritic patient frequently assumes a position in which he flexes elbows and wrists and rests them on his chest for comfort and body warmth. The pressure of the arms on the chest retards full inspiration and slows up circulation.

Prevent outward or inward rotation deformity of hips by propping the legs in position with pillows or sandbags.

Maintain a 90 degree angle of the ankles and prevent foot drop by using a heavy box or bricks at the foot of the bed to hold the feet at right angle and prevent pressure of the bed clothes.

The occupational therapist should plan her equipment so that the patient who must lie flat on his back may maintain the good functional position which is illustrated (fig. 8 *A*).

Sitting Position: Use a flat canvas or board back rest if possible. If a pillow is used it should be firm and extend from the hips to the shoulders. The chin should be in, the head back and the chest high. A firm pillow or roll under the head of the tibia to flex the hip and knee will prevent the patient from slipping down in bed and assuming a poor position.

The patient who may sit up for his occupational therapy should be in the good functional position illustrated in figure 9 *A* rather than in a poor functional position.

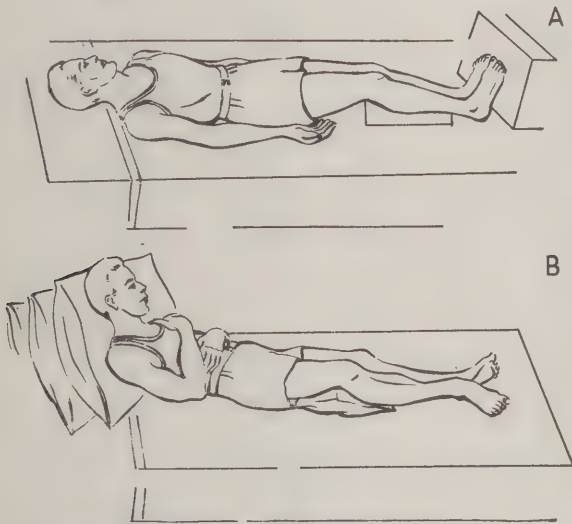


Fig. 8.—The recumbent position assumed in bed by the arthritic patient to prevent deformity and to improve general circulation. *A*, good position. *B*, poor position.

Position in a Chair.—Whether a wheel chair or a regular chair is employed, it should have a straight back. While sitting up the patient should be erect with chin in and chest high. If a pillow is used, it should be below the shoulders so the head is not pushed forward and the chest flattened. The occupational therapist should see that the patient is seated correctly at work.

Guide in Selection of Posture Chairs.—Support at the scapulas is essential. There should be a space between the top of the chair and the seat, so that the patient sits back in the chair. Slats, as shown in the illustration of bad seating (fig. 10 *B*), press against the pelvis, causing rotation and poor posture.

TUBERCULOSIS

"Absence of occupation is not rest, a mind quite vacant is a mind distressed" (Cowper, 1770).

Rest and exercise should be carefully prescribed for the tuberculous patient according to the needs of the patient and the stage of the disease. Occupational therapy plays an important part in adjusting a tuberculous patient to hospitalization from the day of his admission. It provides

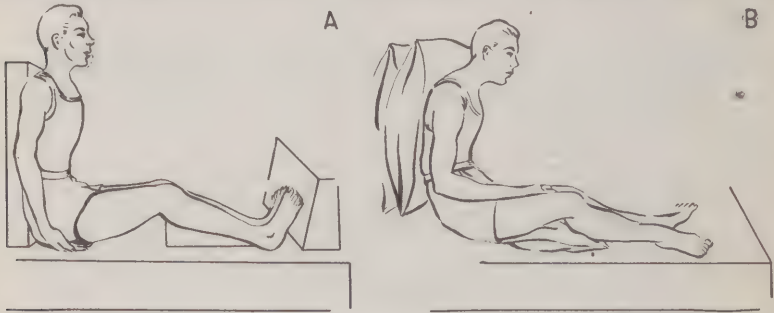


Fig. 9.—The functional position assumed by the arthritic patient sitting up in bed for occupational therapy. *A*, good position. *B*, poor position.

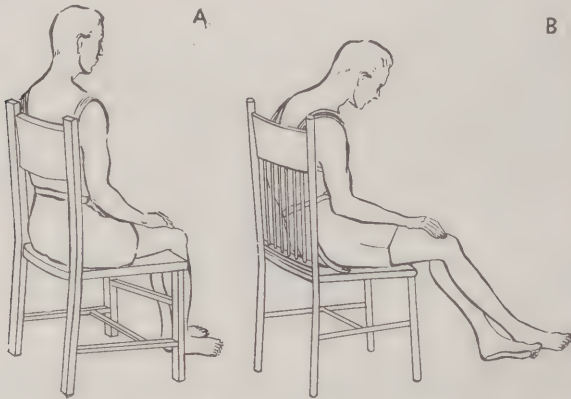


Fig. 10.—The sitting position assumed in a suitable chair by the arthritic patient. *A*, good position in a well selected chair. *B*, poor position in a badly selected chair.

definite and specific means for controlling and grading his physical activity and in replacing habits and attitudes which retard recovery and invite reactivation of the infection. It lays the necessary groundwork for training or employment after he leaves the hospital.

Other contributing factors for the patient may be listed as follows:

1. Occupational therapy may have a sedative effect on a restless patient.

Activities using the processes of thought and the senses of sight and hearing may be instituted before the patient is ready for physical activity. 2. The surgeon may utilize specific muscular exercise to restore muscular function after surgical treatment of the chest. 3. In the subacute stage graded activity is used to reestablish work tolerance. 4. The provision of suitable recreation, education and satisfying undertakings prevents neurotic and unhealthy mental attitudes from developing.

5. Latent skills and potentialities may be discovered and developed in preparation for vocational training.

6. The morale of the patient group is improved by the occupational therapy service in an institution.

Other contributing factors for the hospital may be listed as follows:

1. Occupational therapy increases the patients' cooperation, which is essential in the treatment of this disease. 2. It lessens the number of disciplinary problems, which complicate treatment and administration.

Physiologic rest is essential in the cure of active tuberculosis. The human being, geared to physical and psychic activity, is often unable to make the transition to complete rest without assistance. To lie in bed is possible, but to be at rest requires cessation of psychic agitation, fear, anxiety, worry and boredom. Therefore, the patient's content of thought must be directed in constructive channels, and mental relaxation must be obtained. This requires subtle and intelligent guidance on the part of all those who come in contact with the patient. The occupational therapist may be of great assistance in controlling mental activity by providing compensatory avenues of thinking, hearing and seeing to replace destructive psychic activity.

When the patient is ready to start a program of graded exercise, the physician should estimate the patient's ability to exercise without fatigue. The effect of exercise on temperature, cough, sputum, hemoptysis and weight must receive consideration.

Exercise within the patient's tolerance improves muscular tone, circulation, nutrition and the body functions. However, exercise to or beyond the point of fatigue lowers the patient's resistance and is destructive; although great caution should be used in prescribing and administering activity, its value if carefully prescribed is unquestionable.

Occupational therapy offers an ideal method of inducing rest and of grading and controlling exercise. It is a pliable medium which can be quickly increased or decreased in extent and frequency of treatments, and its results can be measured by the patient's clinical reaction.

PROCEDURE

The following procedure is suggested:

1. Occupational therapy is prescribed by the physician. The prescription should indicate the length of time that the patient may be

occupied and the amount of physical exercise that may be allowed. Any accompanying physical condition or psychologic or social factor should also be noted.

2. The patient's prescription should be changed whenever an increase or decrease of activity is indicated by his clinical reactions.

3. The occupational therapist should keep a careful detailed record of the patient's exercise and reactions.

4. A complete program of occupational therapy not only aids in adjusting the patient to long convalescence and in providing a program of graded exercise but leads into vocational training and placement. Skills and aptitudes are fostered and an opportunity for study and training is made available while the patient is hospitalized. The long period of convalescence can thus be utilized advantageously.

5. On discharge the patient who can do only part time work under medical supervision should be assisted in finding this in a sheltered workshop. The patient who is homebound should be referred to an agency serving homebound persons. The patient who needs vocational training, further education or placement should be referred to the proper source of such help. The patient who is trained in the hospital to carry on intelligently and stay within his physical limitations and who has been rehabilitated physically and vocationally is less likely to break down at a later date.

PREScription

The classification and amount of exercise should be specified by the physician and should be increased or decreased according to the clinical reactions. All the patient's activity should be considered as a unit.

The prescription should also include a statement of the stage of the disease, the prognosis for recovery and any other physical complications.

Suggested Classification for Exercise.—Exercise 1: This includes complete rest in bed, the patient to be fed and given personal hygiene by the nursing staff.

Exercise 2: This includes rest in bed twenty-four hours a day. The patient may sit up to eat, but he is to be given complete nursing care and transported on a surgical cart.

Exercise 3: This also includes rest in bed twenty-four hours a day, but the patient is allowed to take his own bath in bed. He is to be transported in a wheel chair and may sit on a bench or a chair in the corridor of the surgical floor and walk into the treatment room. He is permitted one-half hour of occupational therapy.

Exercise 4: This is the same as exercise 3 except that the patient may go to the bathroom once a day and may sit in a chair beside the bed thirty minutes a day (fifteen minutes in the morning and fifteen minutes in the afternoon). He is to be transported in a wheel chair and is permitted one-half hour of occupational therapy.

Exercise 5: The patient is allowed tray service and full bathroom privileges. He is to be transported in a wheel chair and is permitted one hour of occupational therapy in bed.

Exercise 6: The patient is allowed tray service in the solarium or the dining room in his cottage, and he may walk to roentgen examination, treatment, etc. He is permitted one hour of occupational therapy in quarters and may use the telephone.

Exercise 7: The patient may have street clothes. He takes all meals in the dining rooms and is permitted one hour of occupational therapy in the shop. He may attend church, movies and occupational therapy parties. He may visit other patients once a week, on Monday only. Regular visiting passes will be secured at the business office or in the cottages.

Exercise 8: The patient is allowed to make his own bed and has one hour of occupational therapy but is not given ground privilege. (Ground privilege consists of walking for the time specified in each exercise within the limits allowed.)

Exercise 9: This is the same as exercise 8 except that the patient is allowed one-half hour ground privilege in the afternoon.

Exercise 10: The patient is permitted one and one-half hours of occupational therapy and has one-half hour ground privilege in the afternoon.

Exercise 11: The patient is permitted two hours of occupational therapy and has one-half hour ground privilege in both morning and afternoon.

Exercise 12: The patient is permitted three hours of occupational therapy and has one-half hour ground privilege in both morning and afternoon.

Comment: Patients should consider assignment of exercise in accordance with this schedule as a medical prescription, which will aid as much in ultimate recovery as any drug or other medical measure.

Suggested Activities.—Mental Activities Requiring No Physical Exercise: These include listening to radio programs selected or broadcast by the hospital; reading with a book rest or being read to; looking at pictures, movies, etc.; studying, planning and dictating material, and playing guessing games.

The patient should be helped to develop his mental resources to save his physical strength. His personality and social needs should be studied in order to help in his adjustment.

Physical Activities Adaptable to a Program of Gradual Exercise: These include light craft work, games and puzzles, educational work and prevocational activities.

Socializing Activities: These are directed toward aiding in the adjustment of the patient after a long period of individual treatment and include group projects and parties, radio broadcasts and plays, games and recreations and work on the hospital publication.

Problems Based on a Vocational Point of View: In planning vocations the following factors must be considered: the probable physical capacity of the patient, vocations from which once tuberculous patients are not barred by law, vocations in which there are local openings and vocations not requiring capital.

Cautions.—With reference to occupational therapy the following precautions should be observed:

1. The occupational therapist must be well trained, competent and experienced.
2. For the patient's and the therapist's protection, she should have a physician's signed prescription for treatment and for any changes in treatment.
3. The program of occupational therapy should be carefully correlated with other treatments and should be so pliable that it can be changed at a moment's notice to meet the patient's changing needs.
4. Overstimulation, overexercise and fatigue should be guarded against at all times. That which will relax one patient may stimulate another.
5. The materials and equipment used must be adapted to the treatment of tuberculous patients. Dust, lint, injurious gases and occupations causing strain to the thoracic muscles are to be avoided.
6. Patients must be trained in the rules of good hygiene and required to practice them at all times.
7. Direct sunlight for several hours will prove an effective germicide for equipment and materials.
8. The therapist, for her own protection, should be required to observe rules of hygiene while working with patients.

Comment.—Porter²⁰ stated:

Physical idleness, which is a necessary part of early treatment of the disease, must find its therapeutic counterpart in carefully regulated activity designed to restore work habits and to recreate general work abilities.

A well rounded program of medical supervision of the tuberculous patient has not reached completion until the patient has recovered sufficient work tolerance to permit him to take his place in economic life where he is again able to be independent in a carefully selected occupation in competition with the able-bodied.

Mental and physical activity provides a standard by which the physician can measure the patient's work tolerance. Also, such activity, prescribed wisely, and

20. Porter, E. B.: Vocational Therapy, *Am. Rev. Tuberc.* **45**:392 (April) 1942.

with the approval of the physician in charge, will, in most instances, contribute to speedier recovery than would be the case if the patient continued to carry on a life of comparative inactivity.

A speedy return of the patient to suitable employment when physically ready may provide one important safeguard against the growth of conditions that bring about relapse and subsequent rehospitalization.

For medical and economic reasons, therefore, rehabilitation in the sanatorium should occupy a place of major prominence alongside other techniques used in treatment. Thus the patient will derive maximum benefit from his sanatorium stay and a contribution will have been made to the total plan for returning the patient to a satisfactory status in the shortest period of time.

The following schema represents the transformation of a patient with active tuberculosis to a rehabilitated independent citizen through the medium of a progress plan based on occupational therapy.

Active Tuberculosis

Care in Bed

No physical activity; direct mental activity in aiding adjustment to hospitalization and treatment

Slight and graduated physical activity for improvement of muscular tone; attention to general well-being and psychic well-being

Inactive Tuberculosis

Central Workshops

Increased physical activity; group socialization; preindustrial training and measurement of work tolerance

Discharge

Vocational Training and Education

Sheltered Employment

At home

In workshop

Placement

Follow-up: Medical, vocational, social

CARDIAC CONDITIONS

White²¹ has said:

Occupational therapy is one of the most important and useful measures at the disposal of the physician in the restoration of a cardiac patient to a fairly normal state of health after recovery from acute or subacute illness, and in combating the omnipresent cardiac neurosis which may appear alone or which may complicate true heart disease.

Work is an integral part of the life of the normal man and woman; it should be maintained as a part of the life of those who have physical, or indeed mental, abnormalities so far as it is possible to do so. Of course during acute or subacute illness it is usually essential to impose absolute rest, though even then there are exceptions. During convalescence, however, work in mild degree often hastens a return to good health, and later, when it is possible, it is best to advise the resumption of full work when such work is not too strenuous or exacting, even though there remains permanent scarring of some part of the body.

21. White, P. D.: Heart Disease, ed. 2, New York, The Macmillan Company, 1937.

Prescribing rest in bed does not necessarily bring about true physiologic rest. Anxiety and boredom cause restlessness which is sometimes more vigorous and damaging than light exercise.

PHYSIOLOGIC REST

The occupational therapist's first task is to induce mental and physical relaxation and rest through diverting the patient's mind from his anxiety and guiding his thinking along healthy constructive channels.

For example, when the therapist has become familiar with the patient's interests, she can provide an outlet for him which does not require physical activity. Listening to radio programs, reading and dictating letters, studying and planning are a few of the activities that are used effectively to reduce restlessness and maintain mental health.

GRADED EXERCISE

During convalescence the physician may prescribe a program of graded exercise. Recreations and occupational activities are adaptable as a stimulus, as well as a control of activity. They are objective in character, and the neurotic patient, fearful of exercise, forgets himself in his interest in accomplishment.

The amount and the duration of exercise can easily be controlled. Light activities requiring the use of the fingers only may first be used, then activities employing the forearm and the upper arm. As the improvement of cardiac condition permits, resistance and range of exercise are gradually increased from activities done in bed through ones carried out while the patient is sitting up to tasks done while he is ambulatory and so to shop work.

PRESCRIPTION

The classification and the grade of exercise should be specified by the physician. Exercises should be within the area of the patient's tolerance, and the rate of increase in exercise should be specified by the physician. Overactivity should be guarded against at all times.

The classification of exercise for tuberculous patients is adaptable as a means of prescribing activity for patients with cardiac condition (see page xxx).

Leaman²² stated:

The functional capacity of the patient does not always determine the amount of physical activity which is permitted. There is frequently a difference between the amount of physical activity which the patient can undertake, in terms of his functional capacity, and that which he should attempt, in order to prevent further

22. Leaman, W. G.: *Management of the Cardiac Patient*, Philadelphia, J. B. Lippincott Company, 1940.

cardiac damage and bring about improvement. The recommendation as to physical activity is based upon both the amounts of effort possible without discomfort and nature and severity of the cardiac disorder.

The proper form of occupational therapy can only be prescribed when a complete diagnosis of the patient is at hand and the functional classification determined; consequently it is one of the final considerations in treatment.

FUNCTIONAL CLASSIFICATION OF PATIENTS WITH CARDIAC DISEASE

Class I. Patients with Cardiac Disease and No Limitation of Physical Activity.—Ordinary physical activity does not cause discomfort. Patients in this class do not have symptoms of cardiac insufficiency, nor do they experience anginal pain.

Class II. Patients with Cardiac Disease and Slight Limitation of Physical Activity.—Patients in this class are comfortable at rest. If ordinary physical activity is undertaken, discomfort results in the form of undue fatigue, palpitation, dyspnea or anginal pain. Competition in athletics and other strenuous activity, even hurrying, are to be avoided. Activity should be graded according to cardiac tolerance. A vocational plan should be made according to the permanent mechanical involvement of the heart.

Class III. Patients with Cardiac Disease and Marked Limitation of Physical Activity.—Patients in this class are comfortable at rest. Discomfort in the form of undue fatigue, palpitation, dyspnea or anginal pain is caused by more than ordinary activity. Occupational therapy is first used to induce rest from the cardiovascular standpoint, allowing the circulation to slow down and the reserve power to overcome infections. By this means ultimate damage is minimized. Light activities and a program of graded exercise may later be indicated.

Class IV. Patients with Cardiac Disease and Inability to Carry on Any Physical Activity Without Discomfort.—Symptoms of cardiac insufficiency or of the anginal syndrome are present in patients in this class, even at rest. If any physical activity is undertaken, discomfort is increased. In this class as in class III, occupational therapy is used to induce rest, as well as to decrease anxiety and fear. The program is limited to mental activity and may prove of distinct value as a palliative measure.

Comment.—Leaman²¹ stated:

Patients placed in Functional Group 4 can handle only the types of occupational therapy that can be carried out at bed rest. Although these cases are allowed very little exertion, the mental rest that follows interest in some task that can be carried out for a few hours each day is a considerable aid to children and adults alike. If improvement permits advancement to Group 3, and finally to Group 2 and 1, the value of Occupational Therapy as a future means of earning a livelihood becomes important.

For Class 3 and 4 patients confined to bed, various devices have been arranged to permit tasks requiring the use of the fingers only. Light bed boards may be used, or in some cases, where weaving is carried out, the apparatus can be suspended over the bed. Prolonged hospitalization permits training for occupations which require extensive apparatus, while patients who come in for shorter periods may be assigned to simpler tasks like basketry, cord and leather work. Women patients may, in addition, to any of these types of occupational therapy, renew their interest in different forms of needlework.

Even in shorter illnesses, the psychotherapeutic value of some slight task assigned cannot be overlooked. The patient may be inclined to worry about his condition, the new surrounding may delay his convalescence, hence attempts should be made to interest him in some occupation as soon as his physical state permits.

Occupational therapy, if intelligently supervised and directed by the physician, may be used as directly in treating the cardiac as the orthopedic patient. The prescription should be carried out by a competent and resourceful therapist, and this phase of the patient's treatment should be correlated with his other treatment and activities.

The entire plan of treatment should lead toward maximum physical, psychologic, social and vocational rehabilitation and should be carried on in such a manner as to elicit the patient's hearty cooperation.

The program should serve as an educational medium whereby the patient may learn to stay within his work tolerance, yet develop his resources for as useful and satisfying a life as possible. The program should be so planned that while meeting the need during acute illness, it is leading into a constructive plan for the patient's future.

NEUROPSYCHIATRY

"Employment is nature's best medicine and essential to human happiness" (Galen, 172 A. D.).

PURPOSE OF OCCUPATIONAL THERAPY FOR NEUROPSYCHIATRIC PATIENTS

In case of a neuropsychiatric disorder occupational therapy serves to train the disordered mind to maintain habits of normal activity and to reestablish mental and muscular coordination.

Dr. William A. Bryan²³ stated that work, being reality, provides a powerful aid in keeping the patient in touch with his surroundings. Concentration on a given task demands attention; absorption in a healthy activity tends to dispel disorganized thought. Once interest is aroused, new enthusiasms are created, courage takes the place of discouragement and the patient swings back toward the normal. If a psychosis has reached the point where a cure seems improbable, directed activity within the hospital provides a substitution which aids the patient toward a more comfortable adjustment to a long and indefinite period of hospitalization.

23. Bryan, W. A.: *Administrative Psychiatry*, New York. W. W. Norton & Company, Inc., 1936.

While there is little evidence that occupational therapy has a specific effect on a psychosis, there is much evidence to show that it has considerable influence on the personality of the patient. Therefore, the diagnosis should be considered only as it explains behavior patterns. Stress should be laid on personality problems and reactions. Efforts should be made from the start of the treatment to discover the "well part" of the patient and then through this avenue slowly and carefully to lead him through a transitional period from illness back to health.

WAR NEUROSES

In his Salmon Memorial lectures in this country in 1941 Dr. Robert Gillespie, psychiatric specialist with the Royal Air Force in England pointed out some interesting facts in connection with the so-called "war neuroses." He stated that contrary to public opinion no new neurosis has been born of this war. In fact, because of the necessity of sustaining life under difficult circumstances there had been a noticeable decrease in civilian neuroses. Neuroses among men in the service were undoubtedly induced by their experiences, yet when the neurosis was thoroughly examined, the signs and symptoms were identical with those manifested by neuroses with which a psychiatrist is familiar in his daily practice. He stated that through his recent experiences in wartime England he had found that "the best way to prevent mental breakdown after tragic experiences is to *keep people occupied.*" (The italics are ours.)

Army and Navy routine, through mass activity, may tend to stamp out all individualism and turn a man into a compliant machine, the duty of which is to obey orders and to cease acting on initiative. One of the first duties of the occupational therapist is to seek out what remains of individual thinking and acting in each patient, work to rehabilitate this and so fit the patient for reentry to an environment of individualistic existence.

Of a group of neuropsychiatric patients showing similar signs and symptoms, few will respond to the same stimulus. With some patients it is necessary to apply many and varied stimuli before an association is formed and a reaction is brought about. Therefore, no rule can be laid down that any one activity will work equally well with each patient in the group, although the symptoms appear similar. For this reason, no list of activities can be given as specific cures for any given psychosis. Activities must be adapted from those available in the setup or in special cases from those that can be introduced into the organization.

PROGRAM OF OCCUPATIONAL THERAPY FOR NEUROPSYCHIATRIC PATIENTS

The program of occupational therapy outlined here for neuropsychiatric wartime patients is based on the supposition that treatment

will be instituted as soon as a patient reaches the base hospital. Early treatment of these patients will largely determine whether they will be discharged to further military duty or to an indefinite stay in an institution or the treatment of prolonged psychiatric disorders.

A program of continued treatment for neuropsychiatric patients should be developed on a basis of graduated activities, with therapeutically prescribed participation in hospital industries. Continued motivation through a varied program should be stressed to keep each patient as active as possible and aid in the prevention of deterioration.

For acutely ill patients highly diversified, elastic and progressive programs should be arranged. The processes of the occupational mediums, no matter what form they take, should be so graded as to meet the needs of the highly intelligent, well educated, neurotic person, as well as those of the dull, withdrawn, unresponsive patient. In the past occupational therapy has been thought of in terms of arts and crafts. Today in its broader concept its program embraces any and all activities that in any way contain elements that have curative value. These activities may range in scope from the use of clay by the acutely ill person to arouse his interest and response to the fundamentals of life and thus give him his first step in a program of social rehabilitation through to highly intricate laboratory work, bookkeeping or other hospital industry or routine that may be utilized to fit a patient to take his place in the civilian world. Whether these activities take the form of handicrafts, gardening, recreation, music, dramatics, hobbies or participation in hospital industries, they are the tools with which the therapist administers her treatments. Standards of accomplishment as high as possible should be maintained in order that work habits and pride may be restored. However, the patient should never be sacrificed on an altar of perfection, which may be far beyond his native ability.

Organized systematic work is better treatment than careless haphazard occupation. Every administrator is familiar with the grotesque ways of working which many patients adopt when permitted to work out their own methods—the patient who is placed in a work environment where activity is carried on in an orderly manner will respond better and derive greater benefit than one who is taken to a shop and permitted to do the work in his own way. On the other hand, the therapeutic value of the development of initiative and originality in the choice and execution of projects should be stressed. The patient should be urged to proceed as much as possible on his own, unless the activity chosen should in some way be detrimental to his progress. To prevent his use of initiative destroys the object of the whole program.

In arranging schedules it will be found beneficial to give short concentrated periods to each of a variety of activities rather than too long a period to any one activity. These wartime patients will at best be rest-

less, and interest will be poorly sustained because of the memories of recent experiences. As soon as an activity begins to verge on the routine or can be accomplished automatically, attention weakens and the activity ceases to be curative. While variety must exist, it is essential that the whole program be built up progressively; each new activity embracing new and more difficult processes. The new ideas and processes should be presented to the patient as rapidly as the therapist feels he can absorb them.

The continued treatment program for the rehabilitation of the neuro-psychiatric wartime patient should embrace all the concepts outlined in the program of occupational therapy for the acutely ill service man plus such enlargement and variety as is needed to make a well rounded daily routine.

In such a program consideration must be given to two groups: first, the group who have some chance for recovery through continued treatment and, second, the group who must be trained to adjust to an indefinite period of hospitalization. In either case, morale must be maintained. The patient must be given repeated assurance that he has a chance for recovery or if not recovery assurance that his life in a sheltered environment will be full of interesting worth while activity. It must be pointed out to him, day after day if necessary, that participation in the program outlined for him by his physician is the means toward this end. He must be made to feel that he is needed and his work of value, no matter how insignificant his share in the functioning of the hospital may seem.

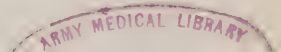
Constant activity and motivation are of the utmost importance in the treatment of the service man transferred from a base hospital to the psychiatric hospital for continued treatment.

Habits are quickly and easily formed after admittance, and it is essential that correct ones be formed as early as possible. Future reactions and results will be largely measured by the patient's adjustment to the prescribed routine of the first few weeks.

In the large psychiatric hospitals activities of necessity are carried on in groups rather than as individual pursuits; therefore, it is all the more necessary that a well balanced program of work, recreation and social activity be prescribed for each patient. In this way it is possible to maintain some measure of individuality within the large group.

These programs, in addition to offering variety of activity as near comparable to normal living as is possible in a sheltered environment, should be graded in effort and demand to meet the needs of the very ill patient with dull physical, emotional and intellectual responses as adequately as they do the needs of the well preserved mentally alert superior person.

In order to determine what activities are indicated or contraindicated for a patient it is first necessary to find out as much about him as possible.



This can best be determined through a series of tests given by the psychologist and the director of occupational therapy under the supervision of the psychiatrist.

These tests should be designed to determine the patient's general vocational and avocational interests and his manual manipulation. On completion of the tests the psychologist and the therapist enter their findings on the prescription slip previously given by the psychiatrist. This slip is now returned to the psychiatrist, who after a study of the findings and an interview with the patient, assigns him to the treatment program which seems best indicated to help him. The prescription slip is sent back to the occupational therapy center with such instructions as are necessary, and the supervisor of the ward is notified of the patient's routine.

All programs should be well balanced, embracing equal proportions of work, rest, recreation and social activities. Stress is laid on the necessity of grading all activity to meet the needs and abilities of the patient, with plenty of opportunity for progression from one group to the next. It should be constantly kept in mind that the life within the sheltered environment should be patterned as closely as possible to normal life on the outside.

Graded programs for continued treatment are institutional or community in scope. The institutional programs include (1) socialization therapy, (2) both (a) occupational therapy—manual, recreational and academic activities—and (b) diversional activity, (3) industrial therapy and (4) association with hospital colonies. The community programs include (1) parole to sheltered workshops and (2) employment in open industry.

Socialization Therapy.—This type of program (also known as a habit-training or a total push program) is administered by trained occupational therapists assisted by trained attendants.

Type of Patient: Patients put on this program are dull, retarded, untidy and asocial.

Object of Therapy: The program is intended to arouse within the patient an awareness of reality and to encourage normal reactions to normal stimuli.

Program: The following daily program is suggested:

- 6 A.M. Rising. The patients dress, wash, bathe and comb hair (under the direction of a selected attendant).
- 7 A.M. Breakfast. Patients are seated at special tables and supervised in regard to table manners and amount of food.
- 7:30 A.M. Personal hygiene. The patients cleanse teeth, comb hair and dress properly.
- 8 A.M. Patients assist with the ward work, making their own beds and arranging the rooms under the direction of an attendant.

- 9 A. M. Calisthenics under the direction of the physical director; out-of-doors exercise, walking, games or singing.
- 9:30 A. M. Occupational therapy of such nature as the director may deem advisable.
- 10:30 A. M. Work put away, each patient assisting.
- 10:45 A. M. Patients taken to the lavatory. Each patient combs hair, washes hands and prepares for dinner.
- 11 A. M. Dinner for those patients served in the ward, followed by rest, smoking, listening to the radio and visiting with other patients.
- 12 Noon Dinner for the rest of the patients at a special table in the main dining room.
- 12:30 P. M. Personal hygiene. Shave every other day. Hair dressing and manicure for women.
- 1:30 P. M. Occupational therapy alternating with recreational therapy, including bus rides, gymnastic exercise, picnics, movies if possible and parties.
- 3:30 P. M. Patients taken to the ward.
- 3:45 P. M. Patients taken to the lavatory to practice personal hygiene and prepare for supper.
- 4 P. M. Supper for those patients who eat in the ward.
- 5 P. M. Supper for the other patients in the main dining room, followed by smoking, listening to the radio, games and reading.
- 9 P. M. Retirement for the night.

Manual, Recreational and Academic Therapy.—This is administered by trained occupational therapists, volunteer assistants in occupational therapy and trained attendants in the occupational therapy center and in the wards.

Type of Patient: Three types of patient are given this treatment: (1) mildly to fully responsive but unstable persons lacking initiative, ability to concentrate and adequacy in carrying on routine tasks without close supervision; (2) persons demonstrating through tests latent ability in handicraft or musical, dramatic, artistic or literary ability, and (3) persons interested in athletics.

Object of Therapy: The object for each of these three types of patient, respectively, is as follows: (1) to assist the patient to maintain and help develop so far as possible what remains of normal thinking and acting and to train him to carry on simple routine tasks; (2) to assist and encourage a talented person to develop and utilize talents both for his own pleasure and for the benefit of the group, and (3) to assign a patient with definite athletic ability and interest to the recreational therapist to assist in recreational and athletic activities, including making and maintaining athletic equipment in the occupational therapy center.

Program: The program carried on daily is as varied and progressive as it is possible to make it, including the following activities: major and minor crafts, repair work, dramatics, puppetry, gardening (vegetable and flower), flower shows, hikes, glee club, orchestra, choir, rhythm band, radio (active and passive participation), hospital publication,

physical education and educational therapy, including courses in English, literature, science, history, languages, mathematics and business.

Diversional Activities.—These activities are administered by volunteer assistants in occupational therapy, the Gray Ladies of the American Red Cross and trained attendants under the supervision of trained occupational therapists.

Workshop: It is quite necessary that adequate quarters be provided for shops or centers from which and in which these activities can be carried on. The size and arrangement of these must necessarily be dependent on the space available and the size and needs of the hospital. All hospital industries should be carefully analyzed to determine which are available and suitable for therapeutic uses. It is not possible or necessary here to give a detailed description of a satisfactorily arranged shop with its full equipment, as these lists can be obtained from the American Occupational Therapy Association in New York. No matter what size or description of plant is available, it is quite necessary that masculine activities prevail, and the men should be made to realize that the shop is theirs.

Psychology of the Shop: The atmosphere of the shop should be casual and informal; military discipline should be minimized. The therapist should be in charge to direct activities and maintain discipline. If she is the right sort of person there will be little need of disciplinary measures, and the patients will have a desire to attend the shop. Without this desire little good is accomplished. In addition to its material and functional use the shop should serve as a laboratory where the therapist can study the reactions, aptitudes, accomplishments and work habits of her patients. If she correctly evaluates, tabulates and presents her findings, they should be of value to the psychiatrist. Even though the shop presents a casual appearance, there should be a definite purpose behind each move, but the patient should never be allowed to become aware of this. He must not know that he is under close observation at all times and that the therapist, although urging him to use his initiative, is ready to step in and help before he reaches a point where failure and frustration may arise from his ignorance of what to do next.

Type of Patient: The patients selected for diversional therapy include those for whom the chance for recovery seems remote and ones engaged in hospital industries or confined to bed who need diversion through simple handicrafts and games.

Object of Therapy: The object of diversional therapy is occupying and maintaining interest in simple activities.

Program: A daily program suggested for the wards includes simple handicrafts with repetitive motions, simple repair work from the hospital

industrial units and games, letter writing, reading, listening to the radio (passive participation), translation, use of Braille, appreciation of radio programs, discussion of current events and social activities, including card and game parties, social dancing, music groups and community singing.

Industrial Therapy.—This type of therapy is administered by the foremen in charge of various hospital industrial units under the supervision of the psychiatrist and in collaboration with the director of occupational therapy.

Type of Patient: Such therapy may be prescribed for all types of patients capable of comprehending and following directions and possessing good work habits.

Object of Therapy: The object of this type of therapy is to place the psychiatric patient in the industry most beneficial to him and to provide developable and sufficient patient help to carry on the work of the various hospital industries. Participation in a program of hospital industries provides training of value after discharge. Industrial assignments should be on a part time basis to allow the patient to participate in other activities and to prevent the danger of his being placed in industry to get the work done without consideration of the therapeutic benefit of the placement.

Program: The program includes part time assignments dovetailing with recreational and social activities. The following departments and units can be utilized to provide therapeutic activity: maintenance, engineering, farm and grounds, warehouse, culinary, housekeeping, janitor service, offices, barber shop, hydrotherapy, laboratory, pharmacy, roentgenology, shoe repair and other mending, sign painting and car maintenance.

Association with Hospital Colonies.—These units are administered by trained personnel under the direct supervision of the commanding officer of the hospital.

Type of Patient: Patients utilized in these colonies are active, intelligent and trustworthy, with good work habits.

Object of Therapy: The object of utilizing these units is to place a patient possessing the required qualifications in a situation which is comparable to open industry yet provides understanding supervision and to test a patient's fitness for return to home environment and open industry.

Program: The daily program is designed according to the facilities available to keep the patient busy all day, thus affording a physical hardening process and developing self-reliance and initiative. It includes farmwork, chicken raising, and manual and mechanical activities involved in clearing land, establishing homesteads, etc.

Parole to Sheltered Workshops Outside the Hospital.—These are administered by trained occupational and industrial therapists in collaboration with social and rehabilitation agencies.

Type of Patient: The patients admitted to these workshops include those ready for discharge but still needing supervision and understanding, especially in cities, before they are ready to return to open industry and those who are able to live comfortably at home but are not equipped either mentally or emotionally to enter open industry.

Object of Therapy: The object of this program is to assist these patients to live adequately outside the hospital even for short periods and to prevent possible resort to house canvassing or begging.

Program: The program involves simple industrial projects, such as furniture repair and other repairs similar to those made by the Goodwill Industries.

Employment in Open Industry.—Object of Therapy: The object of this form of therapy is to return the patient to his former or to new employment in the community in some activity for which he has aptitude or training. The personnel of the hospital assist the patient in finding employment through permanently maintained contact with outside agencies.

ACTIVITIES

Because of the rapid turnover of patients in base hospitals, it is probably wise to have several long term projects on which any number of patients can work. These projects may take the form of repair work, as of shoes or hospital equipment; care of leather or athletic equipment; making of slippers for use in the wards or cases for storage of rugs, and any number of other activities that may suggest themselves to the therapist after she has had an opportunity to learn the needs of the hospital.

Kindwall²⁴ stated in part:

The exploratory, re-integrative, re-educational efforts of the psychiatrist and patient can be greatly facilitated by making it as easy and natural and meaningful as possible for the patient to work productively with those around him. Fortunately, experience seems to show that even in the neurotic, maladjusted person the element of imitation, or suggestibility, or herd-instinct, or identification, or whatever one may call the phenomenon, is not entirely dead, and that there is something contagious in the example of a group of people working for group purposes, when there is a need to be met.

. . . . once the patient has been seduced by circumstances into manual activity of a socially useful kind, he will have taken a first unobtrusive, tentative step toward increased solidarity with the group. And that is the direction toward which are aimed all psychotherapeutic measures, whatever may be their technique and whatever they are called.

24. Kindwall, J. A., and McLean, J. McG.: One Hand for the Ship, *Occup. Therapy* 20:223 (Aug.) 1941.

Music and Recreation.—In discussing recreational therapy for mentally ill persons Davis²⁵ stated:

It is fundamentally important for the therapist to understand that the patient will enter into the activity holding the greatest interest for him. This interest may be normal or abnormal and the therapeutic objective, reduced to its simplest terms, should be to substitute the strongest normal interests available in the particular situation to overcome the dream state or phantasy pre-occupations. Into this situation, both the active and passive aspects of recreational therapy may contribute a distinctive and effective appeal. By the evocation of elements of the primal and instinctive life of the individual as typified in play, the therapist is often enabled to elicit a favorable response when other agencies are ineffective. In passive recreational forms as well, the patients' attention may become focused upon more wholesome trains of thought. Generally it will be found that the most antagonistic types will respond favorably to a highly diversified program of recreational therapy administered with careful reference to their physical, intelligence and personality levels.

The importance of *music* as an aid in the adjustment and cure of neuropsychiatric patients cannot be too highly stressed. Altshuler²⁶ said:

The therapeutic principle of music rests upon close affinity between the human organism and rhythm as well as upon the symbolism inherent in musical sounds. But the chief significance of music as a therapy, I feel, lies in the mechanics of the human brain and the way musical sounds reach and affect it.

Music reaches the mind of the mental patient whose conscious reactions are so dulled that he cannot make a response to normal stimulus. It commands attention, and once attention is gained, it can by various devices be prolonged. Music is used to modify moods. It can be gaged to the speed and tempo of the overactive patient, then gradually slowed up to a more normal level with the resultant effect on the patient's mood. Inversely, it can start at the tempo of the withdrawn, slowed-up patient and gradually be increased in speed, thus bringing the patient nearer a normal level of physical acting. Physically music produces changes in metabolism, respiration, blood pressure, pulse, endocrine activity and muscular energy. The rhythm of music tends to relax.

Group Singing: This activity is at once stimulating and sedative, as well as being a definite socializing agent. Each person has a different reaction to a given piece of music. Patients should be carefully watched to determine which selections seem to have good and which bad effects on the group as a whole. Selections should be carefully chosen to avoid those that seem injurious.

25. Davis, J. E., and Danton, W. R., Jr.: *Principles and Practice of Recreational Therapy for the Mentally Ill*, New York, A. S. Barnes & Company, 1936.

26. Altshuler, I. M.: Part of Music in Resocialization of Mental Patients, *Occup. Therapy* 20:75 (April) 1941.

Dramatics.—Whether participation is active or passive, dramatics affords the patient an opportunity to work off tension, pent-up emotions and conflicts through projection of himself into the character which he plays. Many persons have the ability to write and produce plays. This should be encouraged. Frequently through a study of one of these plays or by watching its production the psychiatrist can find clues to some of the underlying causes of the patient's difficulties. This is particularly true in psychodramatics. The patient watches a play in which he sees his own problems presented with a normal solution. He is invited to change the ending either in writing or by an impromptu act. His solution frequently is the answer to his problems.

CONTACTING THE PATIENT

It is better if a new patient is first brought to the shop after the class to which he is assigned has had an opportunity to get organized for its activities. There is confusion at the start of a class until the men have settled down to work, so it is better for the patient to see his first class with other patients absorbed in their various tasks. He is then inclined to feel that this is the customary routine and will be more likely to conform. The therapist, if she has the opportunity to talk uninterrupted with the patient, can formulate her policies at once. The patient feels that here is a person who is interested in him and on whom he can rely. Thus his own self confidence is built up to the point where he can rely on himself.

First contacts can usually be established by asking the patient to assist with some simple task that the therapist herself is doing. She can tactfully ask him to do the task and excuse herself to assist another patient. By the time she returns the patient has had an opportunity to see what the other patients are doing without being conspicuous. Persuasion is sometimes necessary to gain the patient's cooperation in starting his program. The first project is always the most difficult, particularly with a patient who feels insecure and inadequate. Elated manic patients are usually eager to try everything in the shop. Dull withdrawn patients show little or no interest in any activity. The presentation of a project with simple processes well within the patient's capabilities usually brings a good response as soon as the patient finds he can follow directions. He is then more eager to continue and takes pride in his accomplishments. First projects should embrace fairly rapid processes and technics to offset poorly sustained interest and attention. At this point the therapist has no idea of the patient's abilities or limitations. Therefore, she cannot risk having him turn out a poorly made article, which would only lead to further discouragement

and sense of failure. Success with the first project has more therapeutic value than success with a later one. The patient receives a distinct psychologic lift from his first real accomplishment.

THE THERAPIST

The therapist competent to handle groups of neuropsychiatric wartime patients should first be well trained in the presentation of the technics of the activities she uses for her tools. She should be able to approach her work with a clear understanding of psychiatric problems and have a good knowledge of the psychology of human relations. She should be between 25 and 45 years of age, have good health and be mature, emotionally stable, jolly and tactful, with the ability to respond quickly and adequately to emergencies. In addition, she must be alert to notice and evaluate changes in patients' reactions and adjustments. She must have ingenuity and ability to adapt processes to the needs of the patient. She must have poise and self-confidence without egotism and must give the patient a feeling of security and support until he gains these for himself.

THE PSYCHIATRIST AND THE OCCUPATIONAL THERAPIST

The therapist should work directly under the supervision of a psychiatrist and should at all times be responsible to him. He should give her definite orders for results desired. After she has had an opportunity to observe the patient's reactions and accomplishments, she should discuss a definite program for him with the psychiatrist. As the psychiatrist becomes familiar with the underlying difficulties of the patient, he can advise the therapist of facts which will be of help to her in the administration of the treatment.

Frequent conferences between psychiatrists and therapists should be held for free discussion of patients' problems and programs. The information on the prescription form and discussion of cases at conferences should be supplemented by frequent visits of the psychiatrists to the shop.

Records and Reports of the Occupational Therapist.—The psychiatrist may wish to make his own personal observations on a patient at work in the shop, or he may wish to depend entirely on the reports sent to his office by the therapist. Observation of the patient's response when he is objectively employed in a fairly normal situation may have decided value to the psychiatrist. A satisfactory weekly report can be worked out in code on the patient's daily attendance sheet. For these code notes observations of reactions are made in three fields: (1)

adjustment; (2) ability, accomplishment and work habits and (3) attendance.

In each field qualities or reactions are rated as follows:

| | |
|-------------------|-------------|
| A-excellent | 90 to 100% |
| B-good | 70 to 89% |
| C-fair | 50 to 69% |
| D-poor | 49% or less |

A being evaluated at 100 per cent would be the basis from which positive desirable qualities or reactions would be rated downward to 49 per cent or less into the negative or undesirable qualities or reactions.

Adjustment: Observations are based on the following qualities:

| Desirable | Undesirable |
|-----------------|-----------------|
| Accessibility | Inaccessibility |
| Alertness | Dulness |
| Assurance | Timidity |
| Attentiveness | Distractedness |
| Calmness | Agitation |
| Clearness | Confusion |
| Cooperativeness | Resistiveness |
| Interest | Indifference |
| Reliance | Fearfulness |
| Responsiveness | Muteness |
| Sociability | Seclusiveness |
| Relaxation | Tenseness |

Ability, Accomplishment and Work Habits: Ability. In rating the ability of patients it is necessary to give consideration to natural talents and to training and experience in creative activities. This is important, as a person with considerable ability and experience may because of illness be unable to produce results measuring up to his usual standard, with a resultant feeling of inadequacy.

Accomplishment. This factor is usually dependent on application to a given task and is largely controlled by interest, ability to concentrate and energy drive.

Work habits. These are somewhat controlled by the degree of the patient's illness but are more often dependent on habits formed in youth and frequently indicate the degree of success of the patient in his former employment situation. Observations in this field are based on: degree of ability, confidence in ability, constructive ideas, comprehension of directions, execution of directions, retention of directions, coordination or tremor, dexterity, imagination, industry or indolence, initiative, neatness, productivity, previous training and experience resourcefulness.

BLINDNESS

To take for granted that most of one's necessary reactions are based on sight is erroneous.

William James contended that the senses of hearing and touch are equally as important as vision and are, as a matter of fact, developed earlier in the evolutionary scale. As proof of this it is known that animals depend on their sense of hearing and of smell rather than on vision to warn them of impending danger. Schizoid patients have been known to reach a high degree of efficiency in needlework, weaving, etc., by using their sense of touch instead of sight. This is brought about through their desire to enjoy their own mental images rather than those which would be projected on their consciousness if their eyes were open.

Within each person there seems to lie dormant a vast resource of potential abilities that through training could provide a satisfactory compensating agent to aid him newly blinded to greater independence.

James further stated that it is difficult for a person living on one plane to understand and visualize completely life on another. Therefore, it is essential that persons working with newly blinded patients should have as complete knowledge and understanding of the world of the blind as it is possible to obtain without actually experiencing blindness.

In the first World War it was the policy of the medical corps to place blind men who were adequate in their own daily life in the wards for patients with injured eyes to talk with them and prepare them for possible sightless futures. They accomplished much toward maintaining morale and developing within a newly blinded person self-respect, adequacy in small tasks and a desire to accept the prescribed program of training.

Purpose of Occupational Therapy.—In cases of blindness occupational therapy serves to convince a newly blinded person that blindness does not mean incompetency; to contradict the belief that all is lost if vision goes; to prevent the development of a martyr complex and an attitude of "the world owes me a living"; to prevent depression due to shock of loss of sight; to develop the patient's self-respect and a normal healthy attitude toward himself, his friends and his environment; to develop the patient's confidence in himself and his ability to discuss future plans in a normal manner; to develop the patient's ability to perform simple personal tasks adequately; to discover the patient's aptitudes and develop them; to advise the type of vocational training to lead to economic independence; to acquaint the patient with various agencies, such as social activity clubs for the blind, Braille libraries and the Seeing Eye, and to educate the patient's family and friends, when possible, in their attitude toward the blinded person.

Prescription.—A general prescription plus added specific instructions pertinent to the case, such as psychologic viewpoint, must not be neglected in prescribing for a blind patient.

Records.—General records should be kept plus specific reports on methods and mediums used and the progress of the patient. Definite reports are advised because of the possibility that they could be used later for research.

Procedure.—The following procedure is suggested:

Establish a relationship through visits with the patient even before the bandages are removed.

Offer him encouragement and plan his program, treating this as a perfectly natural procedure.

Give him training in the care of the person, in eating, etc.

Aid the patient in orienting himself through sound, touch, etc.

Urge his participation in games and tasks designed to develop initiative, erase fear and retain social contacts.

Discover latent abilities of the patient and direct their development.

Encourage the patient gradually and consistently to extend the contacts and scope of his environment.

Introduce Braille, typing, etc.

Build up the patient's confidence to a point where vocational training can be started.

Urging may and probably will be necessary to get the cooperation of patients in following through a prescribed program which should be presented with an attitude of "I take it for granted you are able to follow your prescription and will do it."

Native strength of character will be the determining factor in a patient's response.

Qualifications of a Therapist.—A therapist should be specially trained in subjects used in training blind persons, such as Braille, typing, etc.; adept with her fingers and possessed of an ability to make definite simple movements easy to understand and follow, and quiet, stable and steady, with a firm, yet "take it for granted the patient can do as suggested" attitude. She should possess a genuinely sympathetic nature, yet avoid any suggestion of pity and mushy sentimentality, and should have great patience and understanding and should instinctively know when to give praise and encouragement for honest effort. She should have an impersonal attitude when guiding fingers in new and difficult processes.

Cautions.—Overactivity on the part of personnel should be avoided. Noise and commotion are confusing to newly blinded persons and tend to increase feelings of inadequacy. Do not permit persons of the "Pollyanna" type to visit the patients. Their forced cheerfulness is resented.

Once furniture, tools, etc., have been located in the shop and the patients are aware of their placement, they should not be changed without informing the patients.

ORGANIZATION OF AN OCCUPATIONAL THERAPY SECTION IN AN ARMY OR NAVY GENERAL HOSPITAL

An occupational therapy section is established in an Army or Navy general hospital to provide functional and psychologic activity. It is prescribed for the purpose of hastening improvement or recovery from disease or injury. An occupational therapy unit to serve efficiently the full demands of a thousand bed hospital is dependent on the following factors:

1. Properly qualified occupational therapists.
2. Careful prescription and guidance of patients by the medical staff.
3. Coordination of the occupational therapy department with all other hospital departments, particularly the physical therapy department in cases of orthopedic conditions.

4. Adequate equipment and materials.

5. Strategic location of central shops.

6. Satisfactory prescription and record system.

Pillsbury²⁷ stated:

Occupational Therapy has already taken a prominent position in hospitals that deal with seriously injured patients. In the Army, Occupational Therapy Departments have their widest field in the General Hospitals. It has been found that when Occupational Therapy is used in conjunction with Physio-therapy the patients recover function more rapidly than when Physio-therapy is used alone. The scope of Occupational Therapy in the Neuropsychiatric Sections is well-established.

RESPONSIBILITY

The occupational therapist is at all times responsible to the medical officer for following the prescription, keeping records and administering treatment. All patients are accepted for treatment and supervised by this medical officer who may wish to delegate responsibility for the treatment to orthopedic, psychiatric or general medical officers.

BUDGET

To facilitate setting up the department, an initial appropriation for permanent equipment should be established. All purchasing is done through the medical supply officer. Materials standard to medical supply may be drawn from that source—i. e., furniture and fixtures, as is usually allowed in total hospital planning—and are not deductible from the allotment for occupational therapy.

27. Pillsbury, H. C., Brigadier General, M. C., U. S. A.: Personal communication.

ACTIVITIES USED AS THERAPY

The form of treatment should meet the physical, psychologic or social need of the patient and be of sufficient interest to provide the necessary incentive. Occupations used include those work processes normal to men and if possible related to former or future employment. Carpentry, metal work, printing, etc., are adaptable as exercise and aid in psychologic rehabilitation. Interest in the activity must be great enough to stimulate the patient's participation.

GENERAL SETUP AND PHYSICAL PLANT

The section is divided into the following units: the orthopedic shop, ward work, the psychiatric shop and other special shops.

All patients for whom occupational therapy is prescribed are treated under the supervision of the occupational therapy medical officer.

Division of the Services.—Orthopedic Shop: In this unit workshop activities are adapted to ambulatory patients for the specific effect on muscular and articular function. The orthopedic shop should be adjacent or close to the physical therapy unit.

Open Ward Work: Light activity in the ward serves to restore and maintain the muscular tone and articular function of bedridden patients, patients in casts, patients with cardiac conditions, tuberculous patients and others needing this service. Such activity has a beneficial reaction which aids recovery. Storage space for materials used in open ward work should be provided at convenient intervals near the wards.

Psychiatric Shop: This unit provides work activity for the purpose of sedation, stimulation, habit training, work adjustment, prevocational training and evaluation of reactions. Observations should be made available to the physician for his consideration in diagnosis and in planning for the patients. The psychiatric shop should be in the psychiatric section with facilities for segregation of patients.

Other Special Shops: The operation of any special shops is dependent on the physical setup of the hospital.

Setup for the Orthopedic Shop.—Activity in the orthopedic shop is coordinated with physical therapy and occupies a room close or adjacent to the physical therapy department. It is under the direct supervision of a medical officer, who heads both the physical therapy and the occupational therapy service.

The plan of coordinated treatment is as follows: Physical therapy is prescribed as soon after the acute stage as possible; occupational therapy is added when active motion is indicated. This treatment is continued with increased grading of activity until the patient, having reached maximum hospital benefit, is discharged or transferred to a

rehabilitation service. By this coordination of treatment, each department is able to handle a greater number of patients. Through such coordinated services more efficient total planning is possible for the patient.

Equipment: The chief consideration in equipping an orthopedic shop is to have necessary equipment for graded activity in physical restoration. In general, such equipment would include (1) a complete supply of carpentry tools, for example, hammers and mallets of graduated weights; (2) a complete hand printing press outfit; (3) a bicycle jigsaw with orthopedic attachments; (4) work benches, tables and chairs of adjustable heights and sizes, and (5) other equipment according to needs of the patients.

Setup for Open Ward Work.—The supply bases should be located at convenient intervals near the wards. When a patient becomes ambulatory, he is transferred from occupational therapy in the ward to the orthopedic or the psychiatric shop.

Equipment: The equipment for work activity in the ward must of necessity be light in weight. The essential part of the equipment consists of overbed tables and frames that are adjustable to all positions and motions.

Transportation of materials is facilitated by the use of converted surgical dressing carts.

Setup for the Psychiatric Shop.—The psychiatric shop should be a locked shop in a psychiatric ward, preferably in the convalescent unit. Groups of patients can be brought to this shop from other psychiatric wards. Individual work can be done in the wards whenever necessary.

Purpose: Work in the psychiatric shop permits (1) stimulation or sedation of patients, depending on the prescription; (2) evaluation of patients through observation, and (3) maintenance of interest and reduction of restlessness of patients in a locked ward, as well as habit training, work adjustment and prevocational training.

Precautions: The following precautions should be observed: 1. No patient is accepted for occupational therapy without a prescription and precautions signed by the psychiatric officer. 2. A trained corps man, or a specially selected one, must be in attendance at all times in the shop.

Equipment: The equipment should consist of standard workshop tools and material which would provide for such activities as furniture repair, bookbinding, leather work, work in ceramics, painting and knotting and other equipment according to needs.

Other Special Services.—In order to meet the special needs of tuberculous and other patients, special arrangements may be made as needed.

VOLUNTEER ASSISTANTS IN OCCUPATIONAL THERAPY

Volunteers may render valuable service and make it possible to extend the program of the occupational therapy department to include recreational and diversional activities for patients not needing the direct supervision of a medically trained worker.

By regulation, all volunteer services within an Army general hospital are supplied by the Hospital Recreation Corps of the American Red Cross. Included in the training course given to volunteers is a program of diversional crafts which is operated under the supervision of the occupational therapy section. The value of diversional work should not be minimized.

Supervision of Volunteer Service.—All volunteers doing ward crafts are directly under the supervision of the occupational therapy ward worker.

Responsibility of the Trained Occupational Therapist: The therapist should (1) obtain approval from the ward surgeon before initiating diversional treatment, (2) transmit to the volunteer the necessary precautions and interpret the physical limitations in each case and (3) check each individual case and the form of diversion planned and aid in preparation before the volunteer goes to the ward.

Responsibility of the Volunteer: The volunteer assistant should (1) clear every case first through the occupational therapist under whom she works, (2) review her list of patients and their activities each day with the occupational therapist in charge and (3) use her imagination and initiative in interesting the patients.

EMERGENCY TREATMENT OF ACUTE
WAR NEUROSES

MANUAL OF EMERGENCY TREATMENT FOR ACUTE WAR NEUROSES

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NEW YORK

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INTRODUCTION

Most war neuroses begin as acute disturbances. Yet of the patients who have been in the care of the United States Veterans Bureau since the first World War, the majority are sufferers from chronic neuroses.¹ Adequate psychiatric treatment if administered promptly would have prevented the subsequent development of most of these chronic neurotic disabilities. Experience from the battle fronts of the present war indicates that from 70 to 80 per cent of acute neurotic battle casualties can be returned to active combat duty within a short time if they are treated at once.

This is not true in every case, because in some men the stress of war precipitates a previously latent neurosis, which once established yields only to prolonged treatment. Precise statistics as to the percentage

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This paper constitutes a slightly expanded version of a chapter from the "Manual of Military Neuropsychiatry," edited by H. C. Solomon and P. I. Yakovlev, to be published by W. B. Saunders Company.

1. (a) Kardiner, A.: *The Traumatic Neuroses of War*, New York, Paul B. Hoeber, Inc., 1941. (b) MacCurdy, J. T.: *War Neuroses*, London, Cambridge University Press, 1918.

of patients who can be saved by prompt care are not essential to the purposes of this manual, because, irrespective of such statistics, every casualty should be given the benefit of prompt emergency care, in the hope that this may prevent subsequent chronic difficulties.

Much of the emergency treatment of traumatic war neuroses, especially in the incipient phase, can be given by nonpsychiatric medical officers, by enlisted men of the medical corps, by line officers and by experienced noncommissioned officers. It should be administered as close to the front lines and as soon after the strain as possible. Even the more specialized forms of psychiatric treatment may be instituted close to the front line, although they can be completed only in the rear. The table of organization, therefore, should make adequate provision for mobile psychotherapeutic units which can be moved close to any area of active combat. At the same time, one must accept the fact that in modern warfare situations arise in which no treatment of any kind, medical, surgical or psychiatric, is possible. This occurs especially when for long periods isolated units fight in the face of heavy odds without any possibility of rest or replacement. The significance of this will become apparent in the subsequent pages.

My colleagues and I must express our gratitude to the men of the Merchant Marine, and particularly to the men and officers of the National Maritime Union, for their cooperation in a study of the acute neuroses which arise in seamen of the Merchant Marine who have been subjected to bombing, torpedoing, shell fire, machine gunning and prolonged exposure in open boats. Any personal contributions to the principles of treatment described here rest largely on our study of this group of men.²

For a survey of the literature, the interested reader is referred to Brown and Williams,³ Ebaugh and Johnson,⁴ Hoch,⁵ Kardiner,^{1a} Miller,⁶ Rees⁷ and Salmon.⁸

I. THE ACUTE WAR NEUROSES

More frequently than is realized acute war neuroses develop gradually. Only in exceptional instances does a single overwhelming catastrophe cause a breakdown with no preliminary warnings. The

2. Margolin, S. G.; Kubie, L. S.; Kanzer, M., and Stone, L.: *Acute Emotional Disturbances in Torpedoed Seamen of the Merchant Marine Who Are Continuing at Sea*, *War Med.* **3**:395-408 (April) 1943.

3. Brown, M. W., and Williams, F.: *Neuropsychiatry and the War*, New York, National Committee for Mental Hygiene, 1918.

4. Ebaugh, F. G., and Johnson, G. S.: *The Literature on Military Psychiatry Since 1938*, *Am. J. M. Sc.* **201**:905-918 (June) 1941.

5. Hoch, A.: *Recommendations for the Observation of Mental Disorders Incident to the War*, *Psychiatric Bull.* **2**:377-385 (July) 1917.

6. Miller, E.: *The Neuroses in War*, New York, The Macmillan Company, 1940.

7. Rees, J. R.: *Three Years of Military Psychiatry in the United Kingdom*, *Brit. M. J.* **1**:1-6 (Jan. 2) 1943.

8. Salmon, T. W.: *The Care and Treatment of Mental Diseases and War Neuroses ("Shell Shock") in the British Army*, New York, National Committee for Mental Hygiene, 1917; *Recommendations for the Treatment of Mental and Nervous Diseases in the United States Army*, *Psychiatric Bull.* **2**:355-376 (July) 1917.

rule is that collapse occurs only after cumulative stress. Paramount in this stress are the effects of fatigue and hunger, of incessant and increasing danger and of a series of repeated narrow escapes following one another in rapid succession. This was the story of Dunkirk and of every recorded experience in which men in large numbers have broken down suddenly.

It takes time to recover from the effects of sudden danger. When the driver of an automobile has a narrow escape, he experiences a quick sequence of feelings: swiftly mounting tension which culminates in momentary terror, relief, elation, anger and sometimes tears. This is followed by a period in which he circles through these several emotions with lessening pace and intensity, until he finally settles on one, the choice of which depends chiefly on factors within the individual personality. After a variable time there will normally be a return to the emotional center of gravity of that particular person.

But when one threat is followed at once by another, the disturbances become cumulative, because there is no interval in which the emotional reverberations can die out. Therefore ultimately a point is reached at which the compensating mechanisms break down and the sufferer becomes lost in a whirlpool of repetitive distress. Feelings, ideas and actions are drawn into this vortex, with the result that either directly or in some disguised form the patient spends his days and nights living as though he were engaged in an incessant struggle to escape from or master the original danger.¹

These cumulative experiences are typical of modern warfare and are a major cause of rapid breakdowns. When the moments of danger are more widely spaced, the same forces are operative, only more gradually and insidiously. The soldier with a "charmed life" knows that with every fresh escape his chances are less for the next. Consequently, each successive escape contributes to a secret mounting tension.

At some point this becomes manifest. Usually the first sign is a specific disturbance of sleep, and it is precisely at this point that preventive measures can in many cases avert a breakdown if early warning signals are heeded.

II. WARNING SIGNALS OF THE INCIPIENT BREAKDOWN

1. *Sleep Disturbances and Nightmares.*—The first warning of an incipient breakdown is usually a disturbance of sleep, which generally precedes changes in waking behavior.²

There is an increasing difficulty in falling asleep. Sleep comes slowly and with frequent sudden starts. These finally may make sleep impossible, or, after the subject has fallen asleep, similar starts may occur throughout the night. Again, during the process of waking gradually in the morning, the patient may leap from his bed and from the depths of sleep to stand wide awake in terror born of a preceding nightmare.

The importance of this change cannot be overestimated. Darkness, immobility and quiet all lessen the hold on reality which activity provides. When the process of falling asleep is protracted and when sleep itself

fluctuates fitfully, the sleeper is suspended in a half-sleeping, half-waking dream state (the so-called "spontaneous hypnagogic reverie") in which reality is too remote to govern the processes of fantasy. Consequently, fantastic distortions occur as the mind automatically attempts to complete and thus to resolve the terrors and tragedies of the day. This produces terror dreams, in which the anxiety reaches such intensity that it awakens the dreamer, leaving him in a state of restless tension which may make it impossible for him to return to bed, much less to sleep, or even to remain alone.

The more gradual the transition from waking to sleep (or back again from sleep to waking), the more opportunity there is for the occurrence of states in which relentless nightmares recapitulate the day's experiences. Once this starts, it leads rapidly to fear of sleep itself and then to fear of the dark and lonely hours of the night.

2. *Daytime Startle States.*—Once sleep is disturbed, fatigue increases rapidly, which gives rise to abstracted moments during the waking hours in which the patient lapses for an instant into a half-dissociated state. In such moments sudden movements, sudden noises or sudden lights cause a startled panic often accompanied by swift fragments of dreamlike imagery. As fatigue increases and as the moments of terror spread through the day, the patient becomes irritable and depressed and a sense of alienation from his comrades sets in. Thenceforth, fear, hate and loneliness gradually light up any latent neurosis which he may harbor.

In an effort to struggle against this downward spiral, many men use alcohol. Unfortunately, however, alcohol is inadequate for this purpose. Unless taken to the point of profound intoxication, it tends to release and stimulate horror-born reveries instead of blotting them out. A more potent medicament than alcohol is needed.

3. *Other Warning Signals.*—Many subtle changes in daily behavior may be noted as the inner tension mounts: e. g., an abstracted manner; a change in voice; changes in all the simple daily habits, of dress, expression, eating and drinking; tense and awkward movements; irritability; seclusiveness; moroseness; erratic eating and drinking; incessant smoking, and excessive talkativeness or silence. These are hints which should lead to the institution of preventive measures, whether or not any change in sleep has been recognized.

III. PREVENTIVE THERAPY

So far as the soldier who succumbs to an acute combat neurosis is in some obscure way "weaker" than or different from his comrades, preventive measures would have to begin in the nursery or even earlier. So far as such patients are less whole hearted in their devotion to the cause for which they are fighting, prevention becomes a matter of morale, and everything that is conducive to high fighting morale should lessen the incidence of such disorders.

However, since any man may break under sufficient stress, no matter how great are his inherent endowments and no matter how high his

morale, prevention must depend ultimately on the recognition of incipient stages and on the steps which can be taken to stave them off. It is this which deserves to be called preventive therapy.

From the military point of view both morale and preventive therapy are of utmost practical importance. However, since this manual is addressed primarily to medical officers, who have little opportunity to influence the psychologic preparation of troops for combat, only the second issue will be considered.

Three measures are of primary importance in the preventive therapy: First, since the most vulnerable moment in the incipient phase is the transition between waking and sleeping, it is vital to make that transition as nearly instantaneous as possible. Second, one should aim to secure a profound sleep of unvarying depth throughout the night. Third, it is important to bring the patient as swiftly as possible through the transition from deep sleep to full alertness. These measures reduce the disturbing influence of terror dreams and involuntary reveries. The steps involved are as follows:

1. Officers and men should be taught that disturbances of sleep are important. They should be told to note if men are falling asleep slowly; if they complain of disturbing dreams and reveries while falling asleep; if they drop off only to waken with a start; if they waken repeatedly during the night; if they have recurrent dreams and night-mares; if they waken slowly and heavily in the morning, and, finally, if they have disturbing or fearful dreams or fantasies during the process of waking.

2. At the first serious indication of any of these difficulties men should be given a combination of two sedatives, one which is absorbed rapidly and acts rapidly and another which is absorbed slowly and the action of which is sustained. For this purpose we have used a combination of sodium seconal and barbital or of a bromide and chloral hydrate. It is better to give too much than too little. Only if there is a possibility that the soldier may have to fight during the night should this medication be withheld or the dosage reduced.

The dosages are as follows:

| | Capsules to contain | Gm. or Cc. | Grains |
|---|---------------------|------------|----------|
| Sodium seconal | | 0.097 | 1½ |
| Barbital | | 0.324 | 5 |
| One to three capsules to be taken on retiring | | | |
| or | | | |
| Chloral hydrate | | 6 | 100 |
| Sodium bromide | | 6 | 100 |
| Syrup of orange q.s. ad..... | | 100 | 3 ounces |
| Use 1 to 3 teaspoons on retiring. | | | |

3. In order to keep men anchored in reality as they doze off and again as they waken, where possible there should be a low light in the sleeping quarters throughout the night and a psychiatrically trained member of the medical corps in attendance.

This is important because in the hypnagogic reveries which occur during the after-reaction to severe stress, early childhood fears of the

dark and of being alone are reactivated. A dim light and the presence of an adult who is awake lessen these terrors. This simple precaution becomes of increased importance for patients whose disturbance goes beyond incipient manifestations.

4. When the spontaneous return from sleep is slow and troubled, it is important to waken a man swiftly, by letting bright illumination into the sleeping quarters, by shaking him gently but firmly while talking to him and laughing with him and by giving him a cold drink or black coffee almost as his eyes open. Once he is awake, amphetamine sulfate (10 mg. or more) and sometimes thyroid ($\frac{1}{2}$ to 1 grain [0.03 to 0.06 Gm.]) will help to bring him to a level of alertness which will protect him from drifting off into dreamy reveries in which the pressure of his anxieties can again become disturbing. The use of a stimulant as he awakens to balance the nocturnal sedative and to lessen momentary dissociated lapses is especially valuable in the prodromal phases. Once the full-fledged disturbance has arisen, such stimulants must be used with caution, although even here they can be of greater value than is realized.

5. In the prodromal phase, whenever there is a respite from active combat, the day should be divided between planned activities and planned periods of rest. Silent rest periods, however, can themselves cause trouble, because of disturbing reveries. Therefore, during any period of relaxation, attention should be kept anchored and the men should be kept interested, amused and relaxed with music, singing, reading, radio and movies. All available forms of useful active work in groups should be interspersed with such periods of rest.

Close to the front it may be impossible to take such precautions. Inexorable circumstances are rare, however, and an ingenious and determined medical officer, if he knows his men and realizes the necessity for such preventive measures, can save lives and breakdowns by insisting on short interludes from combat duty for men who are showing early signs of accumulating tension and by instituting preventive measures such as those mentioned.

IV. TYPES OF ACUTE DISTURBANCES

Acute war neuroses may take many forms, which vary greatly in severity. These can be grouped under the following categories, which are modified from Miller⁶ and Kardiner^{1a} (Babinski and Froment,⁹ Mitchell¹⁰ and Porter¹¹ have presented contrasting viewpoints which are of historical interest):

1. Simple exhaustion, from which the patient recovers promptly with sleep and food.

9. Babinski, J. F. F., and Froment, J.: *Hysteria or Pithiatism and Reflex Nervous Disorders in the Neurology of the War*, London, University of London Press, 1918.

10. Mitchell, S. W.; Morehouse, G. R., and Keen, W. W., Jr.: *Reflex Paralysis*, Circular no. 6, Surgeon General's Office, March 10, 1884, Washington, Surgeon General's Office, 1884.

11. Porter, W. T.: *Shock at the Front*, Boston, Atlantic Monthly Press, 1918. Porter, W. C.; Novak, J. G., and Lemkau, P. V.: *Therapeutic Considerations for Army Psychiatrists*, Mil. Surgeon **92**:372 (April) 1943.

2. State of more severe exhaustion, with inability to rest or sleep.

3. Overwhelming exhaustion, complicated by varying degrees of starvation, avitaminosis, dehydration and acidosis, with or without wounds, infection, fever, burns, concussion or blast injuries.

4. Confusional states, varying from mild low grade disorientation, with rapidly alternating levels of clarity and confusion, to profound delirious reactions, with total disorientation, severe emotional disturbances, hallucinations and stupor.

5. Diffuse dissociated states: amnesias, fugues, somnambulistic wanderings, trancelike "twilight states," pseudoconvulsive states and states of immobility which may for a period resemble cataleptic and catatonic reactions.

6. Localized dissociations: hysterical paralyses, hysterical spasticities, tics, tremors, ataxias, vertigo and hysterical sensory disturbances involving distance receptors, skin receptors or internal sensory functions.

7. Acute anxiety states of widely varying severity. These may be (a) diffuse and continuous, (b) episodic or (c) "phobic," in that they are precipitated only in certain special situations.

8. Acute emotional eruptions which swing swiftly through the whole gamut of fear, rage, tears and elation. These may occur in a setting of confusion and delirium (category 4) or of transitory diffuse dissociations (category 5).

9. Visceral disturbances. These may involve, for instance, (a) the heart, i. e., "soldier's heart," effort syndrome or neurocirculatory asthenia; (b) the respiratory system, with typical air-hunger and dyspnea; (c) the gastrointestinal system, with hysterical vomiting, any degree of dyspepsia, one of the ulcer syndromes or severe and debilitating diarrhea; (d) the genitourinary system.

10. Acute psychotic and psychopathic disturbances: (a) profoundly retarded depressions; (b) hypomanic or manic excitements; (c) paranoid states, with or without megalomania, more or less systematized suspiciousness, explosive rages, and insubordination and rejection of all military regulation and commands; (d) schizoid trends, with seclusiveness, ideas of reference, typical delusions and acute hallucinatory experiences.

The most frequent disturbance is the simple state of acute anxiety, with hypersensitivity to sudden noise, motion or bright lights, aimless restlessness, diffuse emotional discharges and an inability to escape into sleep at night or to find rest or relaxation during waking hours.

It is possible to describe the emergency care which is ideal for each of these conditions. In practice, however, what can be done will be determined more by the personnel available and by the exigencies of the local situation than by the severity or nature of the neurotic disturbance. Thus, a particular patient may need to be encouraged to blow off steam. Yet if a display of emotion will disturb other troops and if it is impossible to isolate him, his need will have to be sacrificed to the well-being of his companions. In treating any individual soldier, the possibilities of "emotional contagion" must constantly be borne in

mind. This, again, demands a nice balance between protecting the group by the isolation of the disturbing individual and aiding the individual by companionship. Similar considerations apply to morale in the wards and to the handling of patients during the process of transfer. These will be discussed somewhat more fully in the section on "Methods of Group Treatment."

V. EMERGENCY MEASURES AFTER THE NEUROSIS IS ESTABLISHED

For practical reasons the emergency measures after the neurosis is established divide into two major groups, according to whether or not frank psychotic trends are manifested early. Otherwise, the basic principles of emergency treatment are identical in the care of all.

The psychotic casualty becomes accessible to treatment only after he has spent some time in the peace and security of the rear. Before he reaches this haven, however, and during the process of his evacuation, most of the emergency measures for the care of acute neurotic upsets can be used. As a matter of fact, in the turmoil and haste of the combat zone it is quite impossible to differentiate emergency measures to meet the precise requirements of different clinical syndromes. At the front there is no time for intensive investigation of individual cases, and, even if there were, different neuroses at their onsets may resemble one another closely. Therefore emergency psychiatric care must consist of measures which have a chance to be effective quickly in the majority of cases, irrespective of the finer clinical differences which may arise later. For clarity in presentation, these emergency measures will be described as a series of seven major steps, but these steps should be thought of both as overlapping and as taking place progressively from areas of active combat through every stage in the process of evacuation to rehabilitation hospitals. The first steps can be used at any point from the front lines back, wherever and whenever a few days of continuous contact with the patient is possible, whereas the later steps can be undertaken only in special hospitals.

Despite the fact that this is primarily a manual of emergency care, the later steps are included because men with acute neuroses sometimes are evacuated promptly by plane, with the result that when the initial forms of treatment prove ineffective the more specialized later steps must be used as emergency measures to cut short malignant trends and to transform the condition into one which is accessible to simpler procedures.

Step 1: Primary Treatment.—In the initial phases of illness the sufferer from an acute neurotic disturbance has three basic needs, and so far as conditions allow these needs should be met at once:

(a) Controlled sleep. Everything which has been said concerning disturbances of sleep in the incipient phases applies equally to the developed traumatic neuroses.

The same medications are indicated (page 586).

The patient should be precipitated into sleep as swiftly as possible in a dimly lit room.

He should sleep as deeply and evenly as possible throughout the night.

When time comes for him to waken, he should waken or be awakened swiftly.

As far as possible, he should not be permitted to be alone during any phase of sleep.

Once awake, he should be kept alert with coffee, amphetamine sulfate, constant companionship, talk and useful vigorous activity.

(b) Physical restoration. Physical restoration begins with use of a soft, readily assimilable diet of high caloric value, containing abundant fluids, salts and vitamins. The vitamin content of the diet should be supplemented with large doses of vitamin concentrates, to make sure that lowered thresholds of response are not complicated by the effects on nerve trunks and on calcium metabolism¹² of a relative vitamin deficiency.

(c) Hold on reality, through companionship, physical contact, games, reading, work and talk. When a break threatens, a sense of friendly solidarity with others is craved and needed, in order to displace the loneliness, fear and hate, the "kill or get killed" of battle. So far as possible, therefore, a man who is in this state must not be left alone and should be given as much friendly companionship as he can use. He must be made to feel the presence of others through every physical sense—the sound of voices, the grip on the arm or shoulder and the easy rivalry of games. Reading aloud in a group is better than reading silently and alone. The same is true of music and singing, as well as of work. Patients should be detailed to chores in small groups—never to solitary tasks.

This regimen alone, consistently applied, may dissipate a beginning illness. However, when a patient's discomfort persists in spite of it, further special procedures become necessary.

The methods discussed thus far depend on no psychiatric subtlety. To a large extent they can be administered by all medical officers, line officers, enlisted men of the medical services and experienced non-commissioned officers. Inevitably, however, as these simple common-sense procedures are carried out, among any group of casualties some will show more serious symptoms, the therapeutic handling of which requires a greater measure of psychiatric judgment. The method which becomes necessary at this point can be roughly characterized as one of "superficial catharsis."

Step 2: Superficial Catharsis.—Most emotionally disturbed patients try to hide their feelings. When this effort fails, one sees all degrees of anxiety, with shaking, shivering, chattering, starting, dashing away

12. Sargant, W.: Physical Treatment of Acute War Neuroses, Brit. M. J. 2: 574-576 (Nov. 14) 1942.

to hide, sweating, vomiting, urinating and voiding of feces. The patient may become lost in depression with suicidal tendencies, or he may swing to wild and meaningless gaiety. More rarely, anger and a diffuse combativeness and truculence occur. Frequently there will be a rapid circling through the whole gamut of emotions. Either in the midst of these emotional outbursts or in the quieter interludes, there may be an uncontrollable need to talk obsessively and endlessly about home and family, about recent experiences, about the men who have been killed, about the conduct of officers, etc. Since human beings like to blame their troubles on superiors or on subordinates, pet hates and resentments will be heard frequently. The proper handling of such emotional outbursts can make a profound difference in the course of the illness. Wherever local conditions permit, therefore, the following procedures are recommended:

(a) Companionship in isolation. The disturbed patient should be isolated from other patients so as not to communicate his upset to them. Some one should be assigned to him as a companion in his isolation. On this companion, then, will devolve the duty of handling the patient's outbursts in as therapeutic a fashion as possible.

(b) "Gentling." Such a patient should never, under any circumstances, be shamed, reprovéd, intimidated or bullied. He should not be shouted down, argued with or corrected. Neither, on the other hand, should one assent to or acquiesce in unfounded and excited statements, in the hope that this will prove "soothing." Quiet, serious, attentive listening, with a reassuring grip on arm or shoulder, and an occasional seemingly irrelevant suggestion that the man walk around, take a drink of water, eat something, smoke—these are the only responses which are safe at this point. This is because the conscious outpourings of the patient have only a dreamlike relationship to the underlying sources of his discontent, and to allow oneself to be drawn into an argument in the midst of such a disturbance is about as useful as to argue with a dreamer in the midst of his dream that the lion he is dreaming about is not there. On the other hand, silent, attentive, friendly listening, which sets no obstacle to the stream of thought and speech, plus a gradual diversion into simple activities can bring many patients back to contact with the immediate realities of their situation.

(c) Catharsis: Moreover, in many instances the skilful listener can do more than this.

(1) Release from the obsessive waking nightmares. There may be an insistent preoccupation with harrowing recent experiences. This may be expressed frankly in terms of battle situations, or it may be translated into the dangers of ordinary civilian life. For instance, a man who was rescued from a lifeboat after weeks of exposure had somnambulistic waking nightmares which dealt not with the sea, not with the torpedoing of his tanker, not with burning oil but with wholly imaginary fights on the edges of cliffs or at open windows in high buildings. Like a child who awakens from a nightmare only to remain in a daze of terror until comforted by his parents, the soldier

needs some one who by his presence rather than by words gives him the secure feeling of reality which alone can penetrate his terrifying dreams and reveries. He must be made to feel the safety of his comrades as well. He needs to be reminded of such simple facts as that men who have died are no longer suffering. In short, he needs to be helped to bring his incomplete dreamlike fantasies to a close, so that gradually he can regain his hold on reality.

(2) Return to sensations of real life. This hold on reality must be strengthened by use of every sensory pathway. This is why there is comfort in a friendly touch, in the familiar sounds of camp and kitchen, of voices and words and tunes, in the familiar smells of cooking and in the taste of water and food. These familiar sensations are paths back to reality out of the nightmare and fog of battle, and companionship helps unobtrusively to supply these steadying experiences.

(3) Release from obsessive feelings of guilt. Closely related to this is another recurrent theme that requires an understanding ear and an occasional appropriate word. This is the fantastic sense of guilt that haunts many survivors of terrifying experiences. A feeling of guilt over real mistakes is understandable, especially if these increased the danger or cost the lives of other men. More obstinate, however, is the feeling that to have survived at all was somehow at the expense of those who were lost. In his own eyes this patient is the murderer of his comrades. This feeling is particularly striking among survivors of catastrophes at sea, but it has also been noted regularly among survivors of land and air combat which was not purely individual.

Here again the patient's feeling of guilt must be heard with respect, without assent and yet with no attempt to brush it aside or to laugh it off. Indeed, when a man is haunted by images of the sufferings of others yet cannot formulate for himself his feeling of responsibility, it will help him to have some one else put his groping feelings of guilt into words for him. Quietly and gently one can say: "You seem to feel as if you were responsible for their death. We often feel that way if we come through when others die. I know how you feel." Simple words repeated quietly and patiently many times and provoking no argument about whether the man's guilt is justified can gradually discharge much of this pent-up anguish. Such relief can ensue, however, only when the source of the guilt feelings lies predominantly in the present situation. Reassuring words will fall on deaf ears when such feelings have their origins in buried hatreds which are remote from the war situation and which have been relit by the recent combat experiences. When this is true, the therapeutic effort becomes only a diagnostic test and its failure indicates that a more profound neurotic problems remains to be dealt with and that the soldier should be invalidated to the rear.

(4) Relief of rage. There may be rage against officers, against fellow soldiers, or against subordinates. This may present difficult problems; but here again through an attitude of sympathetic and understanding listening the man must be made to feel that he has a right

to his feelings, whatever they are. This must precede any effort to correct a mood. Particularly when one is dealing with rage, it is important to listen with sympathy many times before risking a demurrer to the least of the patient's charges.

When applied by psychiatrically untrained personnel, superficial catharsis can legitimately attempt to go this far but no farther. When this succeeds, it provides an essential emotional and ideational relief. Such treatment remains deliberately superficial, but it is a necessary preliminary to any further release of feeling. Deeper levels of catharsis can be undertaken only by technically trained psychiatrists, working far from the scene of battle. When the ancient storehouse of infantile rage and terror has been mobilized by the war experience to such a degree that buried fantasies of injury and mutilation are set in motion, these can be relieved only by providing the patient with an opportunity to ventilate these historically old and symbolic meanings of current experiences. This should be attempted only by persons who have special training and experience in the technic requisite for such work (pages 593 to 597).

*Step 3: Prolonged Sleep Under Continuous Narcosis.*¹³—There can be no question that the acute war neurosis can be greatly relieved if the patient can be made to sleep so deeply that at no point is his sleep interrupted by the intrusion of disturbing nightmares or obsessional horror reveries. If it is to be effective, however, such treatment cannot be halfhearted. The narcosis must be profound and must be sustained at least for several days, with all of the dangers which this entails. This may create serious nursing problems in the maintenance of nutrition, cleanliness and general physical well-being of the patient. Such nursing problems can be adequately met only in rehabilitation hospitals. It will be obvious that continuous narcosis cannot be employed in any situation in which the subjects may suddenly be called on to fight or where the mobility of modern war may necessitate their quick removal.

Many different medicaments have been recommended and many combinations. It is not possible to choose among these, since no observer has reported comparative statistics, based on large numbers of patients, on the relative merits of different medicaments. Among those recommended are the following:

(1) Soneryl (n-butylethylbarbituric acid) in 6 grain (0.39 Gm.) suppositories, up to 20 grains (1.30 Gm.) per day.

(2) Solution of somnifen (equal parts of diethylamine salt of diethylbarbituric acid and allylisopropylbarbituric acid) 2 cc. (0.19 Gm.

13. (a) Bleckwenn, W. J.: Narcosis as Therapy in Neuropsychiatric Conditions, J. A. M. A. **95**:1168-1171 (Oct. 18) 1930; (b) Production of Sleep and Rest in Psychotic Cases: A Preliminary Report, Arch. Neurol. & Psychiat. **24**: 365-372 (Aug.) 1930. (c) Miller,⁶ pp. 231 et seq. (d) Sargent, W., and Slater, E.: Acute War Neuroses, Lancet **2**:1-2 (July 6) 1940. (e) Sargent,¹² (f) Slater, E.; Sargent, W.; Debanham, G., and Hill, D.: Treatment of War Neurosis, Lancet **1**:107-109 (Jan. 25) 1941. (f) Acute War Neuroses, editorial, New England J. Med. **223**:431-433 (Sept. 12) 1940.

of the drug per cubic centimeter) intramuscularly, up to 60 cc. per day; and supplemented with paraldehyde $\frac{1}{2}$ fluidrachm (1.8 cc.) in capsules, repeated as often as needed.

(3) Paraldehyde, 10 to 15 cc. with elixir of orange and cracked ice by mouth as required or in olive oil per rectum.

(4) "Twilight sleep": scopolamine hydrobromide, $\frac{1}{150}$ to $\frac{1}{100}$ grain (0.4 to 0.6 mg.) with $\frac{1}{6}$ to $\frac{1}{4}$ grain (0.01 to 0.015 Gm.) of morphine sulfate, to be repeated within one and one-half to three hours).

(5) Hyoscine, $\frac{1}{150}$ grain (0.4 mg.) with phenobarbital, $1\frac{1}{2}$ grains (0.1 Gm.) intramuscularly each four hours (Mira).

(6) Sodium amytal, 3 to 6 grains (0.2 to 0.4 Gm.) intravenously each four hours.

(7) Barbital sodium, 10 grains (0.61 Gm.) by mouth, each three to four hours.

(8) Phenobarbital sodium, $\frac{1}{2}$ to 2 grains (0.03 to 0.12 Gm.), by mouth, each three to four hours.

Whatever the drug or combination of drugs, the aim should be to achieve at least twenty hours of sleep out of each twenty-four during the period of treatment. It should be possible to rouse the patient to eat four full meals each day, with adequate administration of fluid and adequate elimination.

At the end of the period of continuous sleep the medication should be reduced gradually, with a gradual return to full activity.

In the event of collapse, 1.5 to 3 cc. of a 25 per cent solution of nikethamide (pyridine-3-betacarboxylic acid) should be given intravenously as an antidote to any of the barbiturates and as a respiratory stimulant. Coffee, amphetamine and intravenous injections of dextrose or plasma may also be necessary on occasion. Respiratory stimulation by inhalation of mixtures of oxygen in carbon dioxide may also be helpful in emergencies.

Step 4: Group Methods.—When many fall ill, methods of treatment for large groups are inevitably sought.¹⁴ The methods used include group lectures, exhortation through speeches, placards and illustrated posters, repeated playing of specially prepared phonograph records,¹⁵ group hypnosis and a more or less systematic mutual analysis by members of the group.¹⁶

The present state of knowledge with respect to group psychotherapy has been admirably reviewed recently by Thomas,¹⁷ with an excellent

14. Blair, D.: Group Psychotherapy for War Neuroses, *Lancet* **1**:204-205 (Feb. 13) 1943. Jones, M.: Group Psychotherapy, *Brit. M. J.* **2**:276-278 (Sept. 5) 1942.

15. Snowden, E. N.: Mass Psychotherapy, *Lancet* **2**:769-770 (Dec. 21) 1940. Miller,⁶ p. 146.

16. Schilder, P.: The Analysis of Ideologies as a Psychotherapeutic Method, Especially in Group Treatment, *Am. J. Psychiat.* **93**:601-617 (Nov.) 1936; Results and Problems of Group Psychotherapy in Severe Neuroses, *Ment. Hyg.* **23**:87-98 (Jan.) 1939. Wender, L.: Group Psychotherapy: Study of Its Application, *Psychiatric Quart.* **14**:708-718 (Oct.) 1940.

17. Thomas, G.: Group Psychotherapy: A Review of the Recent Literature, *Psychosom. Med.* **5**:166-180 (April) 1943.

introduction to the literature. No detailed reports are available on the application of this principle to the acute war neuroses. It is a reasonable avenue of approach to explore further.

Group methods, however, include more than formal instruction of the patients concerning the nature of their problems and of their neuroses. It includes everything which influences the morale of a ward. It implies the watchful eye on the disturbing or disgruntled patient and his influence on others. It includes direct and open handling of the shame of being afraid. During the process of transferring troops, and especially of evacuating them to the rear, it involves the protection of these casualties against the sense of shame which grows in them as they leave the battle zone for the security of the base and begin to realize that they are being invalidated out of the fight without a visible wound. At this point, if they are herded together and set apart as a group of suspects, their morale deteriorates rapidly, and within a few weeks what began as a curable acute neurosis may become a rigid, well defended chronic structure. Therefore, during transfer of patients only those should be handled as a group apart who are relatively unaware of their surroundings or who are disturbing to others. Those who can maintain a fairly smooth front should be handled along with all other casualties, and their morale can often be improved by setting them to work assisting in the transfer of persons who carry the more visible scars of battle.

Step 5: Deconditioning Procedures.—The principle of deconditioning has long been recognized in the experimental laboratory. Its most recent demonstration is in the brilliant work of Masserman.¹⁸ Its practical feasibility and therapeutic value in the treatment of acute war neuroses has yet to be fully demonstrated.

Preventive deconditioning is already being used in the training of troops for special operations through exposure to "live bullets," shrapnel-free land mines and the like. It would seem reasonable to expect that if men in training are led repeatedly through situations which mimic closely the sights, sounds and smells of actual battle it may be possible to desensitize them to the stress which lies ahead. Similarly, once men have broken under that stress, it would seem reasonable to suppose that similar procedures could break down the links between these sights and smells and sounds and the superimposed terror-states and thus return the soldier to his desensitized condition.

An extensive trial of deconditioning procedures is being conducted in the southern Pacific by Commander Uno Helgesson (MC), U.S.N.R., in what is called the "Battle Noise School." Men who have broken under the stress of battle and who show acute hypersensitivity to noise are carried gradually through situations in which in trenches, dugouts and foxholes they are subjected to mock strafing, land mine explosions and simulated dive bombing attacks, with complete protection from any possibility of physical injury. The results of these important experiments are not yet available; but the preliminary impression of observers is that

18. Masserman, J. H.: *Behavior and Neuroses: An Experimental Psycho-analytic Approach to Psychobiologic Principles*, Chicago, University of Chicago Press, 1943.

this will prove to be a valuable method if and when it is applied promptly. It may be curative in many cases, and at the same time it may serve to weed out patients in whom the neurotic roots go deeper than the recent combat experience.

Step 6: Hypnobarcoanalysis and the Induced Hypnagogic Reverie.—Even prior to World War I it was known that in certain types of mental and emotional disturbances the recovery of the patient depended at least in part on the recovery of forgotten memories. Hypnotism had been used for that purpose in the treatment of multiple personalities and of hysterical amnesias. The psychoanalytic technic of free association and interpretation had been used to penetrate to vital information covered by the amnesias that arise in infancy and early childhood. States of hypnagogic reverie had been used for this purpose, sporadically and without systematic investigation, by Silberer,¹⁹ of Vienna, by Boris Sidis,²⁰ of New York and Boston, and by Rorschach.²¹

During the first World War, psychiatrists were confronted with large numbers of acute neuroses induced by experiences which were partly covered by amnesia. Efforts were made to penetrate this amnesia by bringing together in various ways hypnotic technics, psychoanalytic technics and the hypnagogic reverie. Among the contributors in this field were notably Hadfield²² and Eder²³ in England and Simmel²⁴ in Berlin. Many others made significant contributions (see Miller⁶ for a bibliography). Under the exigencies of war, however, methods had to be improvised rapidly, and from existing reports it is not easy to compare the various approaches used and their relative efficacy in meeting identical or different clinical problems. It is all the more unfortunate that in the decades that have intervened since World War I the possibilities of this fusion of methods were not systematically explored until the last few years.

Nevertheless, the work which has been done justifies a few conclusions:

(a) That a skilful and experienced hypnotist can in time induce states of hypnotic dissociation, with somnambulistic and regressive phenomena, in a larger proportion of subjects than was formerly realized.²⁵

19. Silberer, H.: Berichte über eine Methode, gewisse symbolische Halluzinations-Erscheinungen hervorzurufen und zu beobachten, *Jahrb. f. psychoanal. u. psychopath. Forsch.* **1**:513-525, 1909.

20. Sidis, B.: An Experimental Study of Sleep, *J. Abnorm. Psychol.* **3**:1-32, 63-96, 170-207, 1908-1909; An Experimental Study of Sleep, Boston, R. G. Badger, 1909.

21. Rorschach, H.: Assoziationsexperiment, freies Assoziieren und Hypnose im Dienst der Hebung einer Amnesie, *Cor.-Bl. f. schweiz. Aertze* **47**:898-905 (July 14) 1917.

22. Hadfield, J. A.: (a) War Neurosis, *Brit. M. J.* **1**:320-323 (March 7) 1942; (b) Treatment by Suggestion and Hypno-Analysis, in E. Miller,⁶ chap. 7, pp. 128-149.

23. Eder, M. D.: War Shock: The Psychoneuroses in War Psychology and Treatment, London, William Heinemann, Ltd., 1917, p. 154.

24. Simmel, E.: Psychoanalysis and the War Neuroses, London, International Psychoanalytic Press, 1921, p. 59.

25. (a) Kubie, L. S., and Margolin, S. G.: The Process of Hypnotism and the Nature of the Hypnotic State, *Am. J. Psychiat.*, to be published. (b) Hadfield.^{22a}

(b) That a wide variety of sedative drugs can be used to render accessible to hypnotism an additional percentage of subjects who cannot otherwise be hypnotized.²⁶

(c) That the induction of hypnotic phenomena in patients under sedation can be done rapidly and by technics sufficiently simple to be learned readily.²⁷

(d) That the hypnotic state can be used most profitably not as the basis for direct suggestions in an effort to force symptoms to disappear but as a technic for the exploration of unconscious historical material, both remote and recent, which bears on the illness.²⁸

(e) That the recovery of amnesic material under hypnosis can be achieved through the use of free associations and states of hypnagogic reverie. In some cases it proves helpful to supplement this with automatic drawing and automatic writing and a controlled regression to earlier age periods. No generalizations are possible as yet as to the frequency with which these technical adjuvants are needed or the type of case in which they are necessary.

(f) In many instances the hypnagogic reverie alone, without the production of a full hypnotic state, suffices to recover the important amnesic material.²⁹

(g) The hypnagogic reverie can be induced (a) by simple suggestion of total relaxation,³⁰ (b) by simple suggestions plus the use of sedative drugs, (c) by rhythmic, monotonous auditory stimuli,³¹ such as a metronome or bell,²⁰ or by use of amplified breath sounds.^{29a,b}

(h) The amnesic material which is recovered by these various devices will sometimes be direct and accurate recollections of recent traumatic personal experiences; but on other occasions the data will be subjected to fantastic and dreamlike elaborations and to condensation with material from early years. These productions are quite as valuable as the simpler historical information, but in the unraveling of such data technical experience with interpretation of dreams is essential.

26. (a) Hypnotics in Psychotherapy, editorial, *Brit. M. J.* **1**:865-866 (May 25) 1940. (b) Hadfield.^{22b}

27. Gill, M. M., and Brenman, M.: Treatment of a Case of Anxiety Hysteria by an Hypnotic Technique, Employing Psychoanalytic Principles, *Bull. Menninger Clin.* **7**:163-171 (Sept.) 1943.

28. Sargant.^{18d} Slater.^{18e} Footnote 13 f.

29. (a) Kubie, L. S., and Margolin, S. G.: A Physiological Method for the Induction of States of Partial Sleep, and for Securing Free Associations and Early Memories in Such States, *Tr. Am. Neurol. A.* **68**:136-139, 1942; (b) An Apparatus for the Use of Breath Sounds as a Hypnagogic Stimulus, *Am. J. Psychiat.*, to be published; (c) footnote 25 a. (d) Kubie, L. S.: The Use of Induced Hypnagogic Reveries in the Recovery of Repressed Amnesic Data, *Bull. Menninger Clin.* **7**:172-182 (Sept.) 1943.

30. Jacobson, E.: *Progressive Relaxation*, ed. 2, Chicago, University of Chicago Press, 1942.

31. Lovell, G. S., and Morgan, J. J. B.: Physiological and Motor Responses to a Regularly Recurring Sound: A Study in Monotony, *J. Exper. Psychol.* **30**:435-451 (June) 1942.

(i) Finally, whatever the method used, whether it is hypnosis alone, hypnosis under narcosis or hypnagogic reveries with or without narcosis, the recovered material must be fully fused with its appropriate emotional content and with normal waking consciousness. This is achieved by carrying the patient through the procedure not merely once but several times within the course of a fortnight, by reworking the same material with the patient as he emerges from the hypnoid or hypnagogic state, by discussing the material with him freely at subsequent interviews and by having the patient associate freely to the material in undisturbed states of consciousness during the intervals between the hypnoid or hypnagogic sessions.

These various procedures for the exploration of unconscious processes are at present the chief weapon on which psychiatrists rely in their treatment of the acute war neuroses. They have various purposes: (1) to allow the subject to express feelings which he may be dimly aware of yet afraid to express; (2) to allow the subject to become aware of feelings which he may have buried so completely as to be totally unaware of them but which may nonetheless disturb him; (3) to allow the subject to express these deeply buried and unconscious feelings; (4) most important, to penetrate into the amnesic areas of the subject's psychologic processes in order, in a sense, to arouse and "waken" that aspect of the personality and those mechanisms of control which were rendered inaccessible by the traumatic experiences.

A list of medications which have been recommended by various workers in this field follows:

1. Sodium amytal,³² 3 grains (0.18 Gm.) by mouth every three to four hours.
2. Sodium amytal, dissolved in distilled water, administered intravenously at the rate of 1 grain (0.06 Gm.) per minute, the total not to exceed 7½ grains (0.48 Gm.).
3. Sodium amytal, given intravenously as in 2, followed at half-hour intervals by amphetamine sulfate, 10 mg. intravenously, to a total not to exceed 30 mg.

32. Bleckwenn, W. J.: The Use of Sodium Amytal in Catatonia, *A. Research Nerv. & Ment. Dis., Proc.* **10**:224-229, 1931. Harris, M. M., and Katz, S. E.: The Effect of the Administration of Sodium Amytal and Sodium Rhodinate on Mental Patients, *Am. J. Psychiat.* **12**:1065-1083 (March) 1933. Herman, M.: The Use of Intravenous Sodium Amytal in Psychogenic Amnesic States, *Psychiatric Quart.* **12**:738-742 (Oct.) 1938. Horsley, J. S.: Narco-Analysis, *Lancet* **1**:55-56 (Jan. 4) 1936. Lindemann, E.: The Psychopathological Effects of Sodium Amytal, *Proc. Soc. Exper. Biol. & Med.* **28**:864-866 (June) 1931; Psychological Changes in Normal and Abnormal Individuals Under the Influence of Sodium Amytal, *Am. J. Psychiat.* **11**:1083-1091 (May) 1932. Lindemann, E., and Malamud, W.: Experimental Analysis of the Psychopathological Effects of Intoxicating Drugs, *ibid.* **13**:853-881 (Jan.) 1934. Lindemann, E., and Finesinger, J. E.: The Effect of Adrenalin and Mecholyl in States of Anxiety in Psychoneurotic Patients, *ibid.* **95**:353-370 (Sept.) 1938. Palmer, H. D., and Braceland, F. J.: Six Years' Experience with Narcosis Therapy in Psychiatry, *ibid.* **94**:37-57 (July) 1937. Sullivan, D. J.: Psychiatric Uses of Intravenous Sodium Amytal, *ibid.* **99**:411-418 (Nov.) 1942. Footnote 26 a.

4. Simultaneous intravenous injections of 0.2 to 1.0 Gm. of sodium amytal and 10 to 30 mg. of amphetamine sulfate.

5. Pentobarbital sodium in 2.5 per cent solution injected intravenously at the rate of 1 cc. per minute.

6. Evipal sodium, $\frac{1}{2}$ grain (0.03 Gm.) by mouth.³³

7. Pentothal sodium, 0.25 to 0.4 grains (0.015 to 0.026 Gm.) intravenously slowly.³⁴

8. Delvinal sodium (sodium 5-ethyl-5-[1-methyl-1-butemyl] barbiturate) narcosis, plus 10 to 20 mg. of amphetamine sulfate intravenously.

9. Scopolamine hydrobromide, $\frac{1}{100}$ to $\frac{1}{150}$ grain (0.6 mg.) with $\frac{1}{6}$ to $\frac{1}{4}$ grain (0.01 to 0.015 Gm.) of morphine sulfate, not to be repeated within one and a half hours for the smaller doses or within three hours for the larger doses.

The use of narcotics in this fashion is contraindicated for any debilitated patient and for any patient suffering from severe cardio-respiratory involvement or hepatic disease.

As an antidote, 1.5 to 3.0 cc. of a 25 per cent solution of nikethamide intravenously is recommended.

As to procedure, in general, with all methods of intravenous administration of the barbiturates it is advisable to dilute the drug in a larger volume of distilled water than that provided in the ampule which is supplied with the drug. During the process of solution most of these drugs are somewhat unstable. Therefore they should be shaken gently and injected promptly. The outer limit for the stability of the solution is usually set at about thirty minutes. Naturally, no preparation should be injected if any precipitate remains undissolved.

The injection should be made extremely slowly. Some authors recommend that the patient be asked to count slowly during the injection, the injection being stopped at the point at which the counting first shows incoherence and an attempt made to hold the patient at this level by interrupting the injection and adding more as needed. Efforts to maintain rapport should precede the injection and should continue during the injection and throughout the phase of narcosis.

Other workers recommend putting the subject soundly to sleep and then attempting to establish rapport with him only as he is waking from this sleep.

No fixed rules can be laid down in this matter, but the former method seems to me to have definite advantages.

33. Campbell, A. M. G.: Sodium Evipan as an Aid to Psychotherapy, *Guy's Hosp. Rep.* **88**:185-198 (April) 1938. Stungo, E.: Psychological Investigation by Means of Evipan Sodium, M. Press **197**:382-386 (Oct. 26) 1938; Evipan Hypnosis in Psychiatric Outpatients, *Lancet* **1**:507-509 (April 19) 1941.

34. Wilde, J. F.: Narco-Analysis in the Treatment of War Neuroses, *Brit. M. J.* **2**:4-7 (July 4) 1942. Hadfield.²²

Step 7: Shock Treatment.—It may seem inappropriate to consider any form of shock treatment as an emergency measure in the management of the acute traumatic war neuroses. Let it be said at once, therefore, that the value of shock treatment has yet to be demonstrated conclusively and that its field of application is probably limited. Nevertheless, there is at least one theoretic reason for including this method in this discussion, and there are at least a few situations in which it may be a method of choice.

The theoretic basis lies in the fact that many of the phenomena of the acute war neuroses appear to be acute states of partial dissociation, which precipitate the patient into a waking nightmare from which he cannot be roused. Such persons may be inaccessible to any contact, even under narcosis, but can sometimes be brought into rapport either by inducing sustained periods of hypoglycemia³⁵ without coma or convulsions or by one or two electric shock treatments. If these methods are to be used at all, they should be used as soon as the state is recognized and before it has established itself as chronic.³⁶

This is not the place for a discussion of the technic of shock treatments. They should be administered only by persons who are familiar with them.³⁷ A few general considerations should be borne in mind.

(a) Of the various forms of shock treatment, that employing metrazol would seem to be least appropriate for this particular purpose. It would seem inhuman and of doubtful therapeutic value to subject a patient whose illness has resulted from the accumulation of undischarged terror to the extremity of fear and apprehension which generally occurs between the injection of the metrazol and the onset of the convulsion. Furthermore, the psychomotor restlessness and excitement which usually follow the convulsion may last for hours and may be complicated by severe vomiting, cardiac complications and fractures. Even though some of these disadvantages can be partially controlled by the use of curare³⁸ and various sedative drugs,³⁹ the procedure is never freed of its subjective terror by anything less than a general anesthesia,⁴⁰ and the method creates complex nursing problems which seriously limit its usefulness in military neuropsychiatry, except perhaps in rehabilitation hospitals.

35. (a) Bennett, C. R., and Miller, T. K.: Observation on Treatment of Mental Cases with Sub-Shock Doses of Insulin, *Am. J. Psychiat.* **96**:961-966 (Jan.) 1940.

(b) Robinson, G. W., Jr.: Treatment of Delirium Tremens with Insulin in Sub-shock Doses, *ibid.* **97**:136-151 (July) 1940.

36. Good, R.: Convulsion Therapy in War Psychoneurotics, *J. Ment. Sc.* **87**: 409-418 (July) 1941.

37. Jessner, L., and Ryan, V. G.: *Shock Treatment in Psychiatry: A Manual*, New York, Grune & Stratton, Inc., 1941.

38. Bennett, A. E.: Curare: A Preventive of Traumatic Complications in Convulsive Shock Therapy, *Am. J. Psychiat.* **97**:1040-1060 (March) 1941.

39. Harris, M. M.; Horwitz, W. A., and Milch, E. A.: Regarding Sodium Amytal as a Prognostic Aid in Insulin and Metrazol Shock Therapy of Mental Patients (Dementia Praecox), *Am. J. Psychiat.* **96**:327-353 (Sept.) 1939.

40. Neustatter, W. L., and Freeman, H.: Prevention of Fear in Cardiazol Therapy by Preliminary Anesthesia with Cyclopropane or with Nitrous Oxide, *Lancet* **2**:1071-1072 (Nov. 18) 1939.

(b) Insulin shock is a more flexible device⁴¹ and offers certain advantages as well as certain disadvantages. Grave disadvantages are the facts that it is a slow process, that it too is followed by a prolonged hyperreactive phase and that it needs much supervision. On the other hand, the severity of the reaction can be controlled at any moment, and it is possible to induce prolonged states of hypoglycemia with coma⁴² but without convulsion,^{35b} during which a patient may become accessible and in which significant memories can sometimes be recovered.⁴³ From this point of view it is worth further investigation, even if because of practical military exigencies it is not the optimal method of producing the convulsive shock itself.

(c) Electric shock would seem to have many significant practical advantages,⁴⁴ although its therapeutic efficacy in these situations remains undetermined. It is reasonable to raise the question whether the retrograde amnesia so often induced by electric shock may interfere with its therapeutic value and contribute to an elaboration and extension of the amnesic problem of the traumatic neurosis itself. This can be determined only by experience.⁴⁵

Electric convulsive therapy is usually produced by an alternating current. The faradic shock method described by Berkwitz⁴⁶ would have certain practical advantages near the front, since the source of energy need be only a 6 volt dry cell battery. Furthermore, it is a less drastic form of shock treatment in that no convulsion is induced. Its therapeutic value remains to be demonstrated.

41. Polatin, P.; Spotnitz, H., and Wiesel, B.: Ambulatory Insulin Treatment of Mental Disorders, *New York State J. Med.* **40**:843-848 (June 1) 1940.

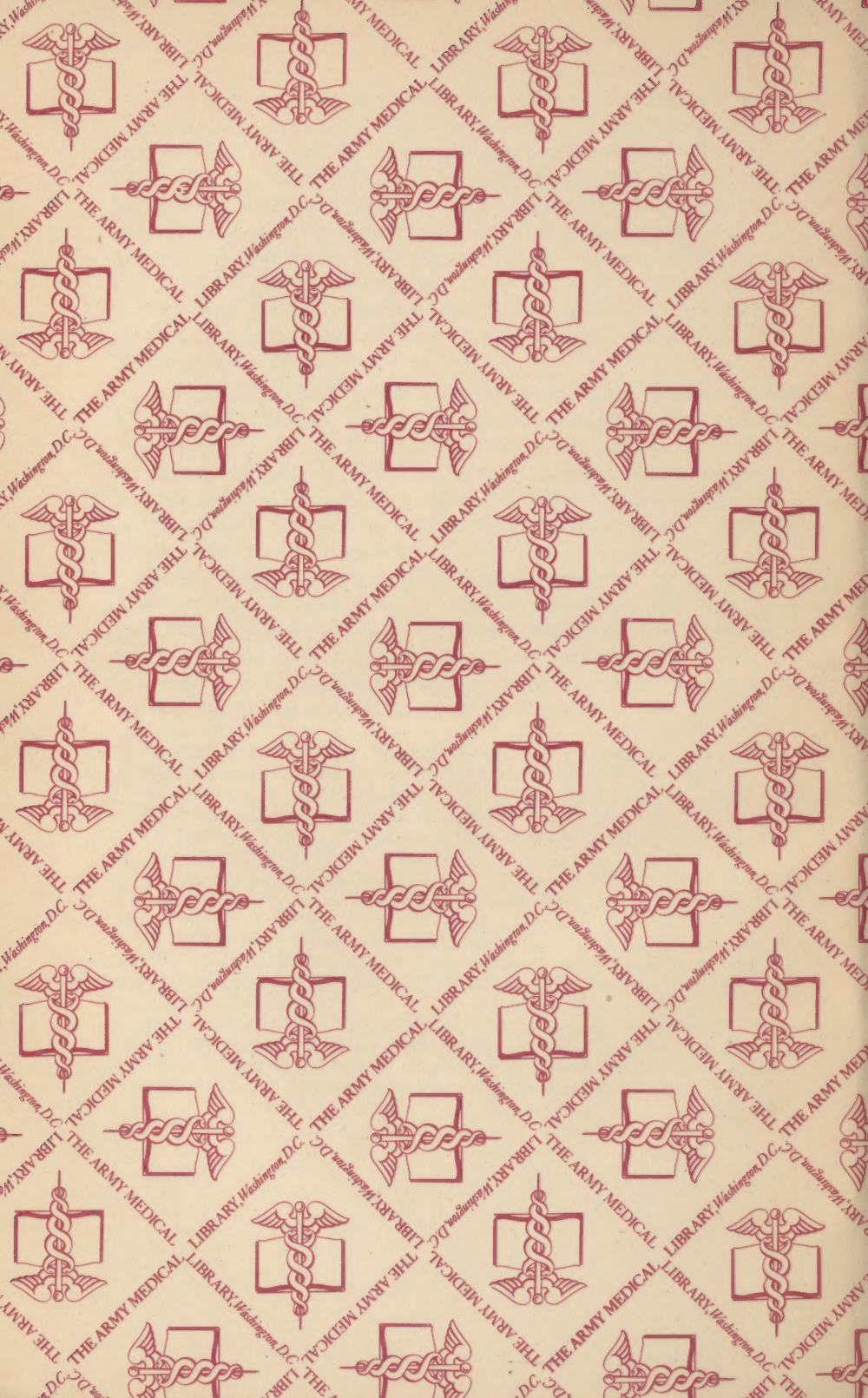
42. Cleckley, H., and Templeton, C. M.: Prolonged Coma in Insulin Therapy of the Psychoses, *Am. J. Psychiat.* **97**:844-857 (Jan.) 1941.

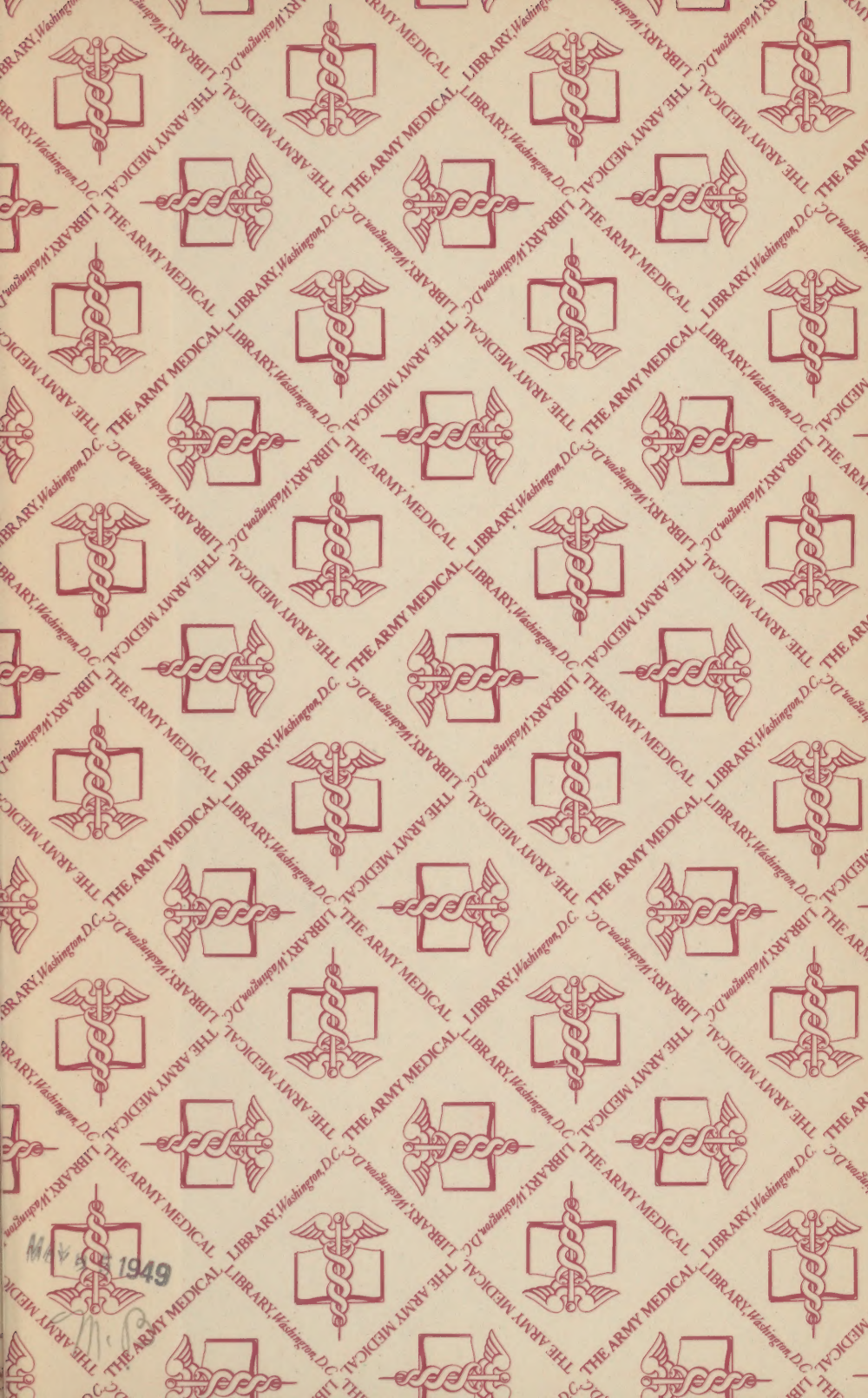
43. Bychowski, G.: Psychoanalyse im hypoglykämischen Zustand, *Internat. Ztschr. f. Psychoanal.* **23**:540-547, 1937.

44. Strauss, E. B., and Macphail, A.: Treatment of Outpatients by Electrical Convulsant Therapy with Portable Apparatus, *Brit. M. J.* **2**:779-782 (Dec. 7) 1940.

45. Polatin, P.; Strauss, H., and Altman, L. L.: Transient Organic Mental Reactions During Shock Therapy of the Psychoses: A Clinical Study with Electroencephalographic and Psychological Performance Correlates, *Psychiatric Quart.* **14**:457-465 (July) 1940.

46. Berkwitz, N. J.: Faradic Shock Treatment of "Functional" Psychoses: Preliminary Report, *Journal-Lancet* **59**:351-355 (Aug.) 1939; Faradic Shock in Treatment of Functional Mental Disorders: Treatment by Excitation Followed by Intravenous Use of Barbiturates, *Arch. Neurol. & Psychiat.* **44**:760-775 (Oct.) 1940.





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